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THE RETIREMENT of Mr. John Taylor, from the firm of John Taylor & Sons, is referred to elsewhere in this issue. To those whose fathers and grandfathers have been mining engineers this is an event of great interest, for as a firm John Taylor & Sons, despite occasional mistakes of judgment such as will befall even the ablest of men, have held a reputation for probity, skill and good sense for three generations such as deserves the emulation of the short-lived partnerships which nowadays play a more public part in mining enterprises. This JOURNAL is old enough to admire a continuity of honorable family tradition and trusts that Mr. John Taylor will enjoy the quietness of retirement, into which he takes with him the good-will of many mining engineers whom he has never seen.

⚒

OUR COMPLIMENTS to Mr. Jno. A. Traylor, who, according to press despatches, when set upon by twelve members of the Miners' Union, at Ely in Nevada, who undertook to "run him out of the town," managed to empty his revolver with such effect that three were killed and three were wounded, the remainder retreating without further discussion. Mr. Traylor is evidently a mine manager who is not to be intimidated. He may have been exacting or coercive—we know nothing of the circumstances, and we hope he was nothing of the kind—but we do feel that a man who could face twelve and drive them off in such a decisive way has the pluck which rarely sides with tyranny of any sort.

⚒

THE ABSCONDING of A. S. Rowe, one of the partners in the firm of Bewick, Moreing & Co., the well-known mining engineers, has created a sensation in London and elsewhere. The defalcation was made by means of an unparalleled series of forgeries, following wild speculations in mining shares, and the amount stolen is reported at half a million dollars. It is announced that Mr. Moreing and Mr. Hoover will make good the losses. Mr. Moreing is now on his way from China. This action is creditable to the gentlemen mentioned, and will cause no surprise.

⚒

MINING IN New Caledonia seems to have its own troubles, and our friends there are much stirred up by recent action of the ore-buyers, who have reduced prices, especially on cobalt ores. The mine operators outside of the large companies are trying to organize a syndicate of their own, and in the meantime are assailing the buyers in the Noumea papers. We have heard of the octopus in this country, and we find him in New Caledonia also. "Infamous octopus," "Vampire," "Vile Animal," "Parasite" —these are some of the names applied to the purchasers of cobalt ores in the *Petit Journal* of Noumea. The formation of the miners' syndicate seems to proceed slowly, however, in spite of all the excitement and bad language.

⚒

THE TESTIMONY taken by the Anthracite Strike Commission since the sessions were resumed on January 8, has been in support of the contentions of the operators against the union. It has been in the main a rehearsal of the story of violence, attacks on non-union men, boycotts and the general condition of anarchy which prevailed in the anthracite region. The witnesses repeated, with details, the events which were described in our columns at the time of their occurrence. Mr. Mitchell and his lawyers attempted to break the force of this testimony, but they failed to show that the union had made any attempt to put a stop to violence. In addition to this, statements have been submitted by some of the companies showing the time lost at different collieries by petty strikes and apparently causeless stoppages of work. Other statements, showing from the books the actual amounts paid miners, have also been put in evidence. The operators are evidently making a careful presentation of their side, and so far it seems an effective one.

⚒

WE ARE GLAD to learn that Mr. Waldemar Lindgren, of the United States Geological Survey, will be deputed to make a supplementary report on the Cripple Creek district. It is understood that Mr. R. A. F. Penrose has so many engagements that he finds it impossible to take up the work which was done so well by him in the report of 1895.

This will be gratifying news to the mine-owners of Cripple Creek, who, last summer, made an urgent appeal to the United States Geological Survey to send Mr. Penrose to examine the district in the light of the deeper developments which have taken place since 1895, when the report of Messrs. Whitman Cross and R. A. F. Penrose was published. From the economic standpoint the mine-owners were justified in presenting their claim for further assistance from the Government, for, assuredly a mining district which has produced over $125,000,000 in twelve years

merits all the help which the scientific departments of the government can give. From a scientific standpoint, the discoveries recently made accentuate the interest which the district invites from the officers of the Survey, so that now, on the two grounds of economics and science, there is ample warrant for the preparation of a supplementary report on Cripple Creek. That this task has been entrusted to Mr. Lindgren will be a matter of satisfaction to the scientific world because he has proved by his published work, such as the "Metasomatic Processes in Fissure Veins," that he is a keen observer of the delicate evidence which most nearly concerns the origin of ores.

⚒

IN THIS ISSUE we publish an account of the determination of the telluride of copper. It is a curious fact that the tellurides of gold, silver, lead, bismuth, mercury, nickel, etc., should have been known so long while the similar compound of tellurium and copper remained unknown until now. The Good Hope Mine, in Gunnison County, Colorado, where this new mineral was discovered, has become prominent during the past two years on account of having afforded very fine specimens of native tellurium, a non-metallic element which has a brilliant metallic lustre, like most of its compounds, the tellurides. The telluride of copper is wholly unlike the other members of the group, and conforms in its physical characteristics to the selenide, which is described in the supplement to Dana's *System of Mineralogy*. The selenide of tellurium—umangite—is represented by the formula, $Cu_3 Se_2$. It is described as being dark cherry red in color, with a violet tinge on a fresh fracture, soon tarnishing, the color becoming violet blue. The streak is black. It has the same unusual sub-character (3 Cu to 2 Se), distinguishing the corresponding telluride, rickardite, which is $Cu_4 Te_3$.

It is likely that the telluride of copper will be found elsewhere now that it has been recognized as a definite mineral. In the electrolytic refining of copper, both tellurium and selenium are frequently present in the anode copper, and in the residual slimes. Although it has not been determined in what combination this tellurium exists, it is certainly present in all of the Butte copper ores. Part is burned out in the converter; the balance remains in the pig copper and goes with the silver slimes, which sometimes contain over one per cent of tellurium. No attempt has ever been made, as far as we know, to recover it from the slimes, as there is no commercial use for it. It is likely, therefore, that proper search will lead to the finding of this mineral in copper ores at Butte and elsewhere.

⚒

SECONDARY ENRICHMENT.

The discussion on secondary enrichment is resumed this week by Mr. Bancroft in a contribution which will prove interesting to many readers of this JOURNAL. One result of a discussion of this kind is to sharpen the observation of mine managers and engineers, so as to lead to the collection of fresh data on the origin of ores. For this reason we are glad to see the subject taken up. At the same time it is proper to draw attention again to the fact that "secondary enrichment" is a scientific subject which lends itself to very unscientific deductions. At the present time, while isolated data are obtainable in many localities, there is practically only one district where the theory can be applied with confidence, and that is Butte. In that region two periods of vein formation are definitely recognizable. The copper veins belong to the first, their predominant accessory mineral is pyrite; the silver lodes belong to a later period; they are characterized by the manganese minerals, rhodonite and rhodochrosite. The occurrence of the copper veins is associated with quartz-porphyry while the silver lodes occur in association with rhyolite; no rhyolite occurs in the copper belt, and no quartz porphyry is found in the silver belt; the rhyolite penetrates the quartz porphyry. Hence the conclusion that the eruptive rock which started the copper mineralization was the quartz porphyry, while the activity of the silver-bearing waters followed the intrusion of the rhyolite. At Butte these relations are clear enough to warrant statements as to relative age. Tetrahedrite, with small amounts of tennantite, is characteristic of the silver veins, and it is believed that this "gray copper" is a *primary constituent* of a *second period* of ore deposition due to *ascending* waters—which is quite a different thing to saying vaguely that it is a product of *secondary enrichment*. Secondary enrichment is an unfortunate term, and opens the way for the most confusing statements unless it is confined to the theory of a secondary deposition from descending solutions which have been enriched by the leaching action of oxidizing waters.

Incidentally, it is interesting to note that the predominant copper mineral in the first-class ores of Butte to-day is enargite. Chalcocite or copper glance predominated down to, say, 1,500 feet, but below this horizon the arsenide of copper is becoming relatively more important.

⚒

THE DRAINAGE ADIT FOR CRIPPLE CREEK.

In the infancy of its development Cripple Creek was considered a very dry district, water had to be transported for boiler use and the few insignificant streams of the region did not suffice to supply the early stampmills. In shaft-sinking water was soon encountered, at varying depths, usually about 350 feet below the surface, and as development progressed it was found, from the records of the first five wet mines, that the water level was at a horizon which stood about 9,500 feet above sea level. The drainage of the district by adits, penetrating the veins at successively lower levels, together with continuous pumping, on the part of mines which went down independently of the adits, has lowered the ground water to the extent of 500 feet below the original level.

Mr. S. W. Mudd, who made a careful investigation of the problem in behalf of the Elkton Company, concluded that the water now being pumped is being drawn from vast accumulations underground, rather than due to a steady inflow from the surface at more or less distant points. He considered that the data obtainable indicate that a depth has been reached where the accumulated water is becoming decidedly less in amount and he estimated that the flow has decreased from 107,000,000 gallons per vertical foot to 44,000,000. He recommended a drainage adit, planned so as to tap the water zone and render further deep explorations possible without the incubus of heavy pumping costs. This recommendation is to be put into effect. We note the fact with pleasure, for it will most assuredly give a stimulus to the further development of a great gold-field.

The careful study of the water problem, which resulted from the unsuccessful attempt of the Elkton Company single-handed to lower the water level, developed the important fact that at the present time the water in the Cripple Creek region is uniform over a very considerable area, its level being 9,042 feet above sea level, or about 15 feet below Elkton's 700-foot level. This drainage basin comprises Beacon, Raven and Gold Hill. The Isabella property and the northeastern part of the district generally, as well as some portions of the southeastern areas—certainly the Gold Coin Mine—seem to be in a different basin, which doubtless includes the Vindicator, Golden Cycle, Independence Consolidated and other ground on the eastern slopes of Bull Hill proper.

The tunnel which is about to be begun will have its entrance near the junction of Arequa Gulch and Cripple Creek, and will be driven in a northeasterly direction to connect with the southern sixth level of the El Paso Mine, a distance of about 4,000 feet. From this point it will be continued, through the granite, for a further distance of from 2,000 to 2,300 feet in the same general direction, until it penetrates the eruptive area where one of the main watercourses will be cut. It is proposed to drive the tunnel from five headings—two in the El Paso workings, two in the shaft which will be sunk about midway and one at the entrance. It is believed that six months will complete the work, though we understand that the contract limit is eight months. The level of the tunnel will be about 235 feet below the present water level. If the main watercourses are found to be connected at this horizon, of which there can be little doubt, it is reasonable to expect that the water during the present year will be materially lowered over an area extending from the Gold King on the north to El Paso and Elkton on the south, and that ultimately this level will be lowered fully 235 feet. It is also quite possible that the influence of this tunnel will extend beyond the limits of the area indicated, though it may be exerted more slowly.

Estimates of cost are in the neighborhood of $80,000, and this amount has been subscribed, largely by the principal companies to be benefited, although we believe that the railroads, smelting and reduction works and other collateral interests have also assisted. That this enterprise marks a new era for Cripple Creek we certainly believe. It is a pity it was not done sooner, as suggested by several representative mining engineers at least four or five years ago, but, of course, at that time the work was not such an obvious necessity as it is now and when mines are in bonanza their owners are apt to be satisfied with conditions as they find them. The Sutro Tunnel was too late for the Comstock—for the ore, if not for the water; the Newhouse tunnel would have fared better if it had been started ten years sooner and the drainage adit planned by Mr. Wm. Byrd Page for Leadville, in 1891, was unfortunately never undertaken, so that in each of these three instances important mining regions suffered from that procrastination which is often fatal to mining operations. Cripple Creek, luckily, is still vigorous and though it has passed the flush of exuberant youth it bears the promise of a steady and vigorous productiveness which will derive an invaluable aid from the engineering undertaking which we have been discussing. May it prosper.

MARKET CONDITIONS.

The metal markets generally continue in very good condition and while little advance is to be reported over last week, business is promising.

Copper is in good demand and the market is apparently ready to take all the metal offered at the present time. As we have already noted, spot copper is not abundant, but purchasers are buying for next month's delivery apparently without hesitation. It is understood that the fire at the United Verde Mine in Arizona seems to be finally extinguished, although some further explorations have got to be made before certainty can be reached on this point. It is probable, therefore, that the mine will soon be reopened and will again be a large producer.

Tin continues in good demand and at good figures. In lead the usual steady trade is being transacted, and there is nothing new to report. Spelter is again somewhat firmer and there is every indication of a good demand at about the current prices.

Silver is somewhat weaker and there is again a tendency to lower prices, apparently. The Chinese indemnity continues to be a disturbing element and the powers are very reticent as to any settlement in the indemnity case. Buying for India which made some showing last week, is now apparently lighter.

In the iron and steel trades the chief development this week has been the demand for foundry iron. Apparently some large concerns have underestimated their wants, or have been unable to secure deliveries on time, and there has been a good deal of inquiry, especially for No. 2. There continues to be a good many inquiries abroad also for Scotch and Middlesboro pig in Great Britain; and it is also said that there has been considerable buying of foundry and basic pig in Germany. In finished material it begins to be apparent that the demand for structural steel will continue very large, while a new demand for bars and plates is coming from the car-builders. Locomotive-builders are also taking good amounts of plates and the western shipbuilders will probably be on the market before long as orders for several new vessels are reported. Many complaints continue to be made by furnaces and mills of slow deliveries of coke, and there have been stoppages in consequence, especially in the Pittsburg District.

The Western coal trade continues in very bad condition. In the large cities even supplies are difficult to get, while in the smaller places and outlying towns many cases of actual distress are reported owing to the failure of the railroads to deliver coal. The railroad blockades have been intensified by the intense cold and heavy snow and all through the northwest there is general complaint.

The seaboard bituminous coal trade conditions remain practically unchanged, coal being in great demand and consumers unable to supply their needs. In the all-rail trade, particularly, there is considerable distress. A large number of industrial concerns, including steel plants having their own coal mines, are unable to get fuel.

In the anthracite trade the action of the independent operators in abrogating their contracts with the railroads, has resulted in the material advance of prices at seaboard points. Railroads are distributing the coal from their tributary points as impartially as possible, but the demand is so widespread and public sentiment so excited that not enough coal can be brought forward to meet the demands of all, and there is considerable suffering in consequence.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

SECONDARY ENRICHMENT AT CRIPPLE CREEK.

To the Editor:

Sir.—In your issue of December 6 I contributed a short article entitled "Secondary Enrichment at Cripple Creek," in which I made the suggestion that the facts as revealed in many of the mines of the camp indicated the presence of two zones of secondary enrichment, one by mechanical concentration and one by chemical agency.

The matter has received quite a little attention from others, and some very interesting facts have been brought to light. In your issue of December 20 you make a few pointed and valuable observations, in which you express the opinion that tetrahedrite is usually good evidence of primary action, and not of secondary. Mr. Forbes Rickard, and Mr. Charles J. Moore have also contributed to the discussion. This discussion is useful, for it means that men are thinking about the matter, and it brings to light interesting facts, and will in the end, I am sure, result in knowledge which will aid all of us, who are interested, in a more intelligent development of the deep levels. That is the end which makes such discussions worth the while for busy men, for unless our theories and speculations will throw light on our work they are worse than useless.

The interest naturally centers in speculation as to the genesis of the large and rich bodies of ore which have lately been discovered at great depths, and which differ from the other ore-bodies of the camp in that the gold occurs in a metallic state associated with gray copper.

I do not wish to place myself on record as the exponent of a secondary enrichment theory with regard to these deep ore-bodies; in fact, I stated very clearly in my former article, and I wish to reiterate here that to my mind the present developments do not warrant drawing any final conclusions. My position in regard to the matter is that of a student, not of a professor. I can see many arguments in favor of the theory of primary enrichment of these bodies and also many arguments pointing to their secondary origin. To promote a discussion, however, it is necessary to take sides, thereby adding the zest of competition to a somewhat dry subject. So in this article I will set forth a few of the facts that strike me as pointing to secondary enrichment, trusting to others to bring out the other side of the argument.

In discussing this subject it is well to start out with a clear understanding of what is meant by "primary" and "secondary." Messrs. Cross and Penrose, in their special report on the Cripple Creek District, advance the theory that in the closing days of the Cripple Creek Volcano there was an epoch of mineralizing action through the agency of heated waters. I have always considered the enrichment of this epoch as "primary." Since that period there has been considerable erosion and oxidizing surface waters have been circulating through the veins, and any reconcentration or leaching occurring during this period I have always looked upon as "secondary." (Of course, the two epochs blended into each other and some ore-bodies may be the product of a combination of agencies.) In your editorial of December 20 you state that "the oxidized ores of Cripple Creek do not carry any evidence of having been rich in copper." This subject of drawing conclusions from a leached and porous ore, as to the constituents which have left it, is a most important and interesting subject, and one in regard to which there has been a great deal of ignorance in the past, and I hope you will further elucidate this subject. For my part I know of only one way of getting knowledge from a leached ore, and that is by studying the pseudomorphs, if any can be found. I will touch on this subject later.

In Van Hise's treatise, "Some Principles Controlling Deposition of Ores," in Volume XXX of the *Transactions* of the American Institute of Mining Engineers, I find the occurrence of a zone of secondary enrichment at Cripple Creek foreshadowed in these words: "In the Cripple Creek District of Colorado and the Judith Mountains of Montana—humid areas—oxidized products are found to the depth of 125 meters. At the time Penrose, Weed and Pirsson examined these districts the workings had not extended beyond this depth, and therefore we have no knowledge as to the depth at which the last of the oxidized products will be found, or as to the depth to which the sulphides and *tellurides* have been reacted upon and enriched by the downward moving solutions from above. *This belt of enriched material may be of even greater depth than that of the oxidized products.*" The italics are mine. As showing further evidence of secondary action at Cripple Creek I quote further from the same treatise: "The evidence of the extensive formation of sulphates in veins by descending water is found in the presence of sulphates in mine waters and in the frequent formationa nd precipitation of basic ferric sulphate in veins, as, for instance, at Cripple Creek."

To show that this ferric sulphate is a natural carrying medium for gold, I quote still further: "Nothing has thus far been said as to the form in which gold is transported. However, it is certain that gold is soluble in the various underground solutions, and especially in the alkaline sulphides. Moreover, gold readily makes combinations with iodine and chlorine, and as an iodide and chloride is readily soluble. Also alkaline iodides are capable of dissolving gold. Furthermore, *gold is soluble in ferric sulphate.* That gold and the salts of gold—one of which we know to exist in nature as a solid, the *telluride*—are soluble in underground solutions is the main point. . . . Gold would be precipitated in the *metallic form*, by organic matter or by any 'ous' salt." While I might quote more exhaustively and give also a series of chemical reactions, I believe the words of such an authority as Van Hise are sufficient to show that gold may very readily be transported by secondary agencies.

Now, as to the particular evidence of secondary action at Cripple Creek: These are many and manifold. Large masses of gypsum (sulphate of lime) occur throughout the district and particularly under Globe Hill. The veins everywhere show an abundance of secondary products. The upper levels of many veins, by their loose and "fallen together" character and by the abundance of iron oxide, show unmistakable leaching action. A little deeper secondary quartz, the "water-quartz" of the miners, is very noticeable. I have seen specimens where calaverite had been decomposed, leaving the sponge gold in the original form of the crystal, and this in turn was coated with secondary quartz. That secondary agencies have been very active indeed at Cripple Creek, I believe is admitted by all observers, but whether these agencies have been active in producing the deep bonanzas recently uncovered, is the question under discussion.

In the first place it is necessary to know something of the nature of these ore-bodies. Those which I have seen are as follows: They occur in veins which were rich in the upper levels. There are several rich streaks, only two or three of which carry gray copper. The other streaks differ in no respect from similar sylvanite streaks elsewhere in the district, except that they carry a little more iron pyrite. I take these sylvanite streaks to be primary deposits. They are hard, compact and suggest little change. The gangue is generally slightly altered country rock. The gray copper streaks on the other hand seem to follow later and more open fractures. There is much quartz present, and crushed rock cemented with quartz is a common form. The quartz itself often shows signs of crushing and re-cementation, as though movement had taken place during its formation.

The "gray copper" is principally tetrahedrite. Pure tetrahedrite is $Cu_8 Sb_2 S_7$, or in percentage, S 23.1, Sb 24.8, Cu 52.1. I have also found small quantities of copper glance. I cannot say it was chalcocite

as no crystalline structure was observable. I believe the copper glance is simply a very recent alteration of the tetrahedrite in place. Now, it will be noticed that tetrahedrite is a combination of copper, antimony and sulphur, and I have qualitatively isolated all three of these substances.

My own experience has led me to regard gray copper as very good evidence of secondary action. I have seen it in so many cases where it fitted Mr. Emmons' theory of secondary enrichment to a nicety, that I had come to regard it as almost as good evidence of secondary action as chalcocite or bornite. Since my views have been questioned, I have looked the matter up in the writings of authorities on the subject, and find but one mention of it as a primary mineral, while I find the following references to it as a secondary formation. Dana's Mineralogy states that tetrahedrite is found, among other places, at "Central City, Gilpin County, Colorado, in fine crystals, often in parallel position *coating chalcopyrite.*" At another place, speaking of the alterations of chalcopyrite, it is stated that it "changes on exposure, especially if heated, to a sulphate, . also to tetrahedrite."

Mr. S. F. Emmons mentions gray copper as a product of secondary enrichment in the Yankee Girl Mine, Red Mountain District, Colorado. Prof. De Launay, who has studied the literature of Mexican and South American mines very thoroughly, confirms my own observation in Mexico as to the very general occurrence of gray copper in the zone of secondary enrichment, saying "The silver is here (enriched zone) in the state of sulphide, the copper as chalcocite, *gray copper* or bornite. In Mr. Emmons' conclusion of his treatise on secondary enrichment he makes this statement: "The third zone may be called the zone of sulphide enrichment, in which the materials brought down in solution, and not deposited in the zone next above, are deposited as sulphides, also as sulph-arsenides and *sulph-antimonides*, or in some cases as the native metal." Mr. W. H. Weed, in his article, entitled "Enrichment of Gold and Silver Veins," mentions tetrahedrite and tennantite as constituents of zones of secondary enrichment in the San Juan region of Colorado.

Perhaps the most conclusive proof that tetrahedrite may be of undoubted secondary origin is found in the investigations of Daubrée, who found tetrahedrite as a coating on Roman coins, which had lain for centuries in waters containing feeble solutions of mineral sulphates. To quote from Mr. Emmons again: "Paragenetical study of the ore-deposits shows that the earliest formed minerals are quartz, pyrite, chalcopyrite and enargite. Enargite is in some cases later than chalcopyrite. The richer sulphides which constitute the most valuable ores of the middle levels of most mines are of later origin." Chalcopyrite contains 35 per cent sulphur to 65 per cent metal, while tetrahedrite contains 23 per cent sulphur to 77 per cent metal. I think the above references are sufficient to establish the fact that gray copper is of somewhat general occurrence as a product of secondary enrichment.

Now, as previously stated, the only way that I know of for guiding the judgment in considering whether a leached and oxidized ore did or did not contain a certain metal in its sulphide state lies in studying the pseudomorphs of the oxidized zone. Sometimes they can be found and sometimes not. In the Last Dollar Mine, of Cripple Creek, one of the largest and richest of the gray copper ore-bodies has been discovered, and above this deposit in the oxidized zone I have seen many specimens of hollow quartz splinters, the recesses of which show them to have been filled at one time with crystals of stibnite. The gray copper below gives a strong reaction for antimony. Prof. Patton, of the State School of Mines, has examined specimens of these pseudomorphs, and says that in all likelihood they are after stibnite, the sulphide of antimony. The only other likely mineral would be aragonite and the crystal faces as shown by the pseudomorphs do not agree with the aragonite habit of crystallization. Moreover, stibnite crystals have been found in this vein, while no aragonite was ever found.

As to copper, I have never found any pseudomorphs which one could say were certainly derived from copper pyrite. On the other hand, I have never searched very diligently for them. Copper pyrite is frequently found at Cripple Creek, in specimens, and copper carbonates I have seen in the Orpha May and American Eagle mines, and native copper was found in sinking the Logan shaft. Furthermore, the average of all the analyses made to date at the Colorado City plant of the U. S. Red. & Ref. Company shows .08 per cent copper. This average represents a good many hundred thousand tons from all levels of the camp. One would not expect anything more than a trace of copper in the leached zone. We, therefore, have pseudomorphs of antimony and traces of copper in the leached zone, and we have the two together in a concentrated form below.

In the gray copper ore, specimens are found showing clusters, the size of a pea, of very minute crystals of metallic gold. It is well known that free gold is very rare in any but the oxidized ores of Cripple Creek, and then only in a brown and rusty form. This fine crystalline gold suggests secondary action, because, as stated above, the precipitating agents common to secondary action would precipitate the gold in the metallic form.

To sum up, the arguments which appeal to me as indicating secondary enrichment are: First, the occurrence of gray copper, which is a very general constituent of ores of secondary origin; second, the occurrence of the gray copper with secondary quartz; third, the occurrence of the gray copper in later and probably "post mineral" fractures; fourth, the evidence of the pseudomorphs and the traces of copper, and fifth, the occurrence of fine crystalline gold with the gray copper.

GEO. J. BANCROFT.

Denver, Colo., Jan. 4, 1903.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

"Metallics" is the term applied to those bits of ductile metal (usually native gold, silver or one of the malleable sulphides) which do not pass through the sieve of the assayer, in that process of final pulverization which the pulp undergoes before being weighed for the crucible.

The United States produces no tin. None has been produced since 1892. The mines at Riverside, California, and those at Harney Peak, South Dakota, were the last to be productive.

Of the total output of bituminous coal in the United States, a little over one-quarter is mined with machines. The amount which is undercut in this manner increases annually. Over 4,000 machines were in use in 1901; they mined 57,843,335 tons of coal.

Molybdenite, which is often mistaken for graphite, is the sulphide of molybdenum. The demand for it has increased on account of the discovery, comparatively recent, that it gives very beneficial properties to steel.

Tellurium, which occurs native at the Good Hope Mine, in Gunnison County, Colorado, is a silver-white metal, like tin, but it has a marked cystalline structure. It has a very limited use in the arts.

Lithium is used in the manufacture of lithium carbonate; this is the basis of the lithia waters, which are regarded as having good medicinal effects. Lithium, in the form of the oxide, lithia, is derived from lepidolite and spodumene. The former occurs in large deposits at Pala, San Diego County, California, and the latter is chiefly obtained from the Etta group of mines, in the Black Hills of South Dakota.

Lyell's fundamental proposition, which revolutionized the study of geology, was that no causes whatever have, from the earliest time to which we can look back, to the present, ever acted but those now acting; and that they never acted with different degrees of energy from that which they now exert. This extreme interpretation of uniformity in kind and degree has been modified by later geologists.

It is wholly impossible to prove that any phenomenon whatsoever is not produced by the interposition of some unknown cause. But philosophy has prospered exactly as it has disregarded such possibilities, and has endeavored to resolve every event by ordinary reasoning.

The mica of commerce is derived chiefly from pegmatite veins, occurring in granite and gneiss. Blocks of mica as large as four feet in diameter have been obtained. North Carolina produces more than two-thirds of the total production of the United States.

The father of John Richard Green, the historian, was a man of great tenderness and simplicity. John, when a boy, was constantly asking him questions, to which the ordinary reply was, "I do not know, but I will try to find out." This may be considered as the attitude of every true scientific inquirer.

Mica is used as isinglass for stove windows; it is increasingly employed in electric insulation. The scrap mica, as distinguished from the plates or sheets, is ground to fine powder and employed in the manufacture of lubricants and for obtaining the glaze given to wall papers.

The contention for uniformity of action throughout geological time is based solely upon the value of man's personal evidence, and when the term of this is compared with that term beyond which it does not extend, the propositions are such as to render it comparatively valueless.

Edward Forbes used to say that no one who has dredged much can ever wonder at so many rocks being wholly devoid of organic remains.

A mist of words, like halos round the moon, though they enlarge the seeming size of thoughts, make the light less, doubly. It is the thought writ down we want, not its effect, not likenesses of likenesses; and such descriptions are not more than gloves, instead of hands to shake, enough for us.

The difficulty which men have of conceiving the aggregate effects of causes which have operated throughout millions of years, far exceeds all other sources of prejudice in geology, and is yet the most unphilosophical of all.

Lord Brougham once said he hoped a time would come when every man in England would read Bacon. William Cobbett, that you may have heard of, said he would be contented if a time came when every man in England would eat bacon.

Practical life is a rule-of-three sum, in which your duty multiplied into your capacity and divided by your circumstances gives you the fourth term in the proposition, which is your deserts, with great accuracy.

Cryolite is a fluoride of sodium and aluminum, and it is commercially valuable as a source of these two metals. It is a snow-white mineral, with a partial transparency which makes it resemble ice. Cryolite is obtained almost exclusively from Ivigtok, in Greenland. Widespread search has been made for it in the United States, but it has only been found in very small quantities, in Colorado and in the Yellowstone Park. In 1901 this country imported 5,383 tons of cryolite, valued at $70,886.

THE TELLURIDE OF COPPER.*

By W. E. Ford.

The new mineral to be described in this paper was first brought to the writer's attention by Mr. T. A. Rickard, of New York. A qualitative examination proved that it contained copper and tellurium, and no such combination having been hitherto described, the mineral seemed worthy of investigation. Through the courtesy of Mr. Rickard, sufficient material was afterward obtained for making a quantitative analysis, the results of which are given below.

Rickardite occurs at Vulcan, Colo., in the Good Hope Mine, owned by Dr. Loui Weiss. The vein mineral is chiefly pyrite, with which occurs native tellurium in unusually large masses, some of which measure fully 3 inches across. Other associated minerals are petzite, berthierite in imbedded prisms resembling stibnite, and a greenish brown micaceous substance, perhaps roscoelite. A large body of native sulphur also was found in the vein. Rickardite itself occurs in small lense-shaped masses, generally rather intimately associated with native tellurium.

The material for analysis was broken up and carefully gone over by hand to free it from any adhering gangue and only perfectly clean and homogeneous fragments were used. The method of analysis was simple. The powdered mineral was oxidized by nitric acid, which was subsequently removed by evaporation with sulphuric acid. To the strong sulphuric acid solution a liberal amount of hydrochloric acid was added and then sulphur dioxide gas was led into the solution, which precipitated the tellurium in metallic form. This precipitate was filtered onto a Gooch crucible, dried in the air bath at 100° C. and then weighed. In the filtrate copper was precipitated by hydrogen sulphide and determined as cuprous sulphide by igniting in a stream of hydrogen. Careful tests were made for gold, silver, lead, selenium, sulphur, arsenic and antimony with only negative results. The analysis follows:

	I.	II.	Average.	Atomic ratios.
Cu=	40.68	40.81	40.74	.6469=4.00
Te=	59.36	59.06	59.21	.4737=2.93
Total	100.04	99.87	99.95	

These results give the ratio Cu: Te = 4.00: 2.93, or very nearly 4.00: 3.00, and the formula for rickardite therefore is $Cu_4 Te_3$. This gives as the theoretical composition of the mineral, Cu = 40.51; Te = 59.49, which agrees very closely with the analytical determinations. Rickardite is therefore not only a new mineral but also a new type of telluride, for no such four to three relation between metal and tellurium has hitherto been noted in the group of tellurides. The mineral may be regarded as consisting of one molecule of cuprous telluride and two of cupric telluride, $Cu_2Te.2CuTe$.

Rickardite has an unusual and beautiful purple color, which rivals in intensity the deepest purple tarnish ever seen on chalcopyrite or bornite. The color, however, in the case of Rickardite is not due to any tarnish, for it shows on a fresh fracture and the powder of the mineral, even when ground very fine, is of the same deep color. The mineral is massive in character with an irregular fracture. Its hardness is 3.5 and its specific gravity was determined as 7.54. It is fusible at 1 and gives a pale azure blue flame color tinged in the outer parts with green. Alone on charcoal before the blowpipe it gives a white coating of TeO_2 and fuses to a brittle globule of copper telluride. Fused with sodium carbonate and borax on charcoal it gives a coating of TeO_2 and a brittle globule of telluride, yielding only with considerable difficult ya malleable globule of copper. Roasted in the open tube the mineral fuses to a semi-transparent mass of brown color, which is apparently some combination of the oxides of tellurium and copper, and only a faint sublimate of TeO_2 is formed on the walls of the tube. Heated in the closed tube it fuses and undergoes no further change. Heated in concentrated sulphuric acid it gives the characteristic reddish-violet color of tellurium. When dissolved in nitric acid, the solution neutralized with ammonium hydroxide gives the deep blue of copper.

It is a pleasure to name the mineral "Rickardite" after Mr. T. A. Rickard, who obtained the material for investigation and supplied the data as to its occurrence. Thanks are also due Dr. Weiss, of the Good Hope Mine, who has been careful to secure all specimens which might be of scientific interest. In conclusion, the writer wishes to express his indebtedness to Prof. S. L. Penfield for his constant advice and assistance during the preparation of this article.

*Abstracted from a paper entitled "Rickardite, a new mineral," *American Journal of Science*, Vol. xv, January, 1903.

CRIPPLE CREEK PRODUCTION IN 1902.

By Our Special Correspondent.

The production of the Cripple Creek District for the year 1902 shows a slight increase over that of 1901 as far as values are concerned, but in regard to the tonnage, shows a decided increase. The output of the district during the year 1902 amounted to 629,954 tons of ore, of a total value of $18,550,859; of this, 145,954 tons of ore of the average value of $44.76 per ton, making $6,531,179, were handled by the smelters, and 484,000 tons of the average value of $24.83 per ton, making $12,019,680, were handled by the chemical mills. The output for the past year, it will be seen, shows an increase of about $500,000, as regards values, while the tonnage shows an increase of about 115,000.

The output for the district since its beginning is as shown below:

1891	$2,300	1897	$11,500,000
1892	585,010	1898	14,200,000
1893	2,010,367	1899	15,662,400
1894	3,250,787	1900	19,862,594
1895	6,970,015	1901	18,039,999
1896	8,499,300	1902	18,550,859
		Total	$119,133,631

The following table, giving the output for 1901 and 1902, will be interesting:

	1901.	1902.		Changes.
Total tonnage	514,465	629,954	I.	115,489
Smelting ore, ton'ge	184,465	145,954	D.	38,511
Milling ore, ton'ge..	330,000	484,000	I.	154,000
Total value	$18,039,999	$18,550,859	I.	$510,860
Val. smelting ore..	8,964,999	6,531,179	D.	2,433,820
Val. milling ore...	9,075,000	12,019,680	I.	2,944,680
Val.Smelt.ore per ton	$48.60	$44.76	D.	$3.84
Val. Mill. ore per ton	27.50	24.83	D.	2.67
Av. val. ore per ton.	35.06	29.45	D.	5.61
% Smelt. ore, ton'ge	35.75	23.17	D.	12.58
% mill. ore, ton'ge..	64.25	76.83	I.	12.58
% smelt. ore, values	49.69	35.21	D.	14.48
% mill. ore, values..	50.31	64.79	I.	14.48

The average value of the ore has decreased; the amount, and particularly the percentage of the smelting ore has decreased, and the milling ore largely increased. Lower grade ore can now be handled than at any time in the history of the Cripple Creek District, a number of companies getting a contract rate of $5.75 per ton for ore up to 0.5 ounce per ton. This also includes freight to the mills.

While the rates of treatment are lower, wages are the same, and the cost of timber, supplies and water are a little higher, and fuel is about the same. At present there seems to be no prospect of any lessening in the cost of these things, and it remains for the reduction in freight and treatment charges to enable lower grade ore to be shipped. It does not seem probable that the treatment rate will be lowered very much during the next year on the ordinary ores, though it may be on a certain class of oxidized ores. A number of dumps of this class of ore have been handled at a profit, it is understood, even when the dumps do not run over $5 per ton.

The leasing system has increased very greatly during the past year, and, as a large portion of the Stratton estate is to be leased out, the system will probably show a considerable increase during the coming year.

PROPERTIES OF ALUMINUM.—Albert Granger reports (*Bulletin Societe Chemique* (3), XXVII, No. 15; *Chemical News*, LXXXVI, 284, December 12, 1902), that whereas at the ordinary temperature aluminum is a tough and hard metal, difficult to cut or saw, when heated to about 600° C., it undergoes a change of structure which causes its properties of tenacity and hardness to be modified considerably. It becomes granular and can be broken with ease, and if the temperature be raised sufficiently high the metal can be completely crushed. By using small quantities at a time it can be powdered in a mortar, like zinc, but if too large a quantity be tried the grains become agglomerated owing to the pressure of the pestle.

DETERMINATION OF SULPHUROUS ACID.—E. Rupp reports (*Berichte der Deutsche Chemiker Gesellschaft*, XXXV, xvii, 3694), that sulphur dioxide can only be iodametrically determined if its solution be added to excess of iodine until complete decolorization occurs. If iodine be added to excess of sulphurous acid errors arise through the reducing action of iodohydric acid. In the determination of sulphur dioxide in alkaline solution the chief difficulty is the low reaction speed toward the end of the titration. The determination can be made accurately, however, by adding to the sulphurous acid solution a considerable and known excess of decinormal iodine solution and allowing to stand at least 15 minutes, after which the excess of iodine is titrated with decinormal sodium thiosulphate.

RESULTS OF THE OIL CONCENTRATION PROCESS.—At a recent meeting of the Institution of Mining and Metallurgy in London, Mr. Walter McDermott said, with regard to the oil process, that so far as they had tested concentration by the oil process, not much had been done for lead ores. The few experiments had given quite promising results, and in the case of lead ores, as with copper ores, there seemed to be a peculiar difference in regard to the surface condition of the mineral, which would have an effect upon the extent to which the oil would affect a saving. Apparently, two copper ores of similar chemical composition were sometimes different in their physical properties, and would not work equally well when treated with oil; and the same with silver lead ores. It had something to do with the surface condition, and might have some relation to the way in which the mineral had been deposited. The statement that the process could be carried out with perfect cleanliness had been borne out by the experience gained in three plants now running in England. There was no difficulty in keeping the oil in its proper place, as, of course, the question of dirtiness in connection with the oil process, the same as with any other material, would depend upon the extent of loss by slopping over, and any marked slopping over and consequent loss of oil would be detrimental to the success of the process. The arrangements of a mill depended very much upon the constructor and the manager. The difference between two differently constructed or differently managed concentration mills as to dirtiness was often exceedingly marked. A perfectly clean mill was likely to be doing very much better work than a very dirty one. It was possible that, after the best was done on the treatment of slimes both in silver and copper mills, by water concentration, on many ores the oil might be found to make an additional saving. In fact, the chance for a wide application of the process must depend upon this, since it was quite evident that if there was a good saving by water concentration people could not be expected to use oil.

MECHANICAL FEEDING OF SILVER-LEAD BLAST FURNACES.*

BY ARTHUR S. DWIGHT.

Historical.—A silver-lead furnace fed by means of cup and cone was in operation in 1888 at the works of the St. Louis Smelting and Refining Company at St. Louis, Mo., but it is probable that previous attempts had been made, since Hahn refers (*Mineral Resources of the United States*, 1883) in a general way to experiments with this device, which were unsuccessful because the heat crept up in the furnace and gave over-fire. At the time of my visit to the St. Louis works (in 1888) the furnaces were showing signs of over-fire, but this may not have been their characteristic condition. Mr. A. F. Schneider, who built the St. Louis furnaces, afterward erected, at the Guggenheim works at Perth Amboy, N. J., round furnaces with cup and cone feeders, but although good results are said to have been obtained, the running of refinery products is no criterion of what they would do on general ore smelting.

Cup and Cone Feeders.—The cup and cone is an entirely rational device for feeding a round furnace, but is quite unsuitable for feeding a rectangular one. Furnaces of the latter type were installed for copper smelting at Aguas Calientes, Mex., with two sets of circular cup and cone feeders, but disastrous results followed the application of this device to lead furnaces. The reason is clear when it is considered that a circular distribution cannot possibly conform to the requirements of a rectangular furnace. A more rational device was designed for the works at Perth Amboy, N. J.

Pfort Curtain.—About 10 years ago some of the American smelters adopted the Pfort curtain, which, as adapted to their requirements, consisted of a thimble of sheet iron hung from the iron deck plates so as to leave about 15 inches of space between it and the furnace walls, this space being connected with the down-take of the furnace. The thimble was kept full of ore up to the charge-floor. This device was popular for a time, chiefly because it prevented the furnace from smoking, and diminished the labor of feeding, but it was found to give bad results in the furnaces, it being impossible to observe how the charge sunk (except by dropping it below the thimble), while the curtain had to be removed in order to bar down accretions, and most important—it caused irregular furnace work and high metal losses, because it effected a distribution of the coarse and fine material which was the reverse of correct, the evil being emphasized by the taking off of the gases close to the furnace walls.

Terhune Gratings.—R. H. Terhune designed a device (United States patent No. 585,297, June 29, 1897), which comprised two grizzlies, one on each side of the furnace, sloping downward from the edge of the charge floor toward the center-line of the furnace. The bars tapered toward the center of the furnace, the open spaces tapering correspondingly toward the sides, so that as the charge was dumped on them a classification of coarse and fine would be effected. This device is correct in conception.

Pueblo System.—In the remodeling of the plant of the Pueblo Smelting and Refining Company in 1895, under the direction of Mr. W. W. Allen, mechanical feeding was introduced, and the system was the first one to be applied successfully on a large scale. The furnaces of this plant are 60 by 120 inches at the tuyeres, with six tuyeres, 4 inches in diameter on each side, the nozzles (water cooled) projecting 6 inches inside the jackets. The height of the smelting column above the tuyeres is 20 feet. The gases are taken off below the charge floor, and the furnace tops are closed by hinged and counterweighted doors of heavy sheet iron, opened by the attendant, just previous to dumping the charge car. In the side walls of the shaft are iron door-frames, ordinarily bricked up, but giving access to the shaft for repairs or barring out without interfering with the movement of the charge-car. Extending across the shaft, about 18 inches above the normal stock-line, are three A-shaped cast iron deflectors, dividing the area of the shaft into four equal rectangles.

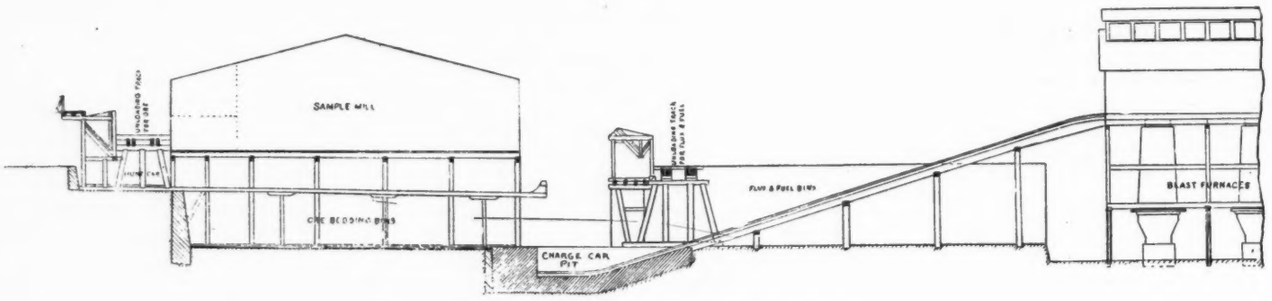


FIG. 1.—PUEBLO SYSTEM. SECTION THROUGH INCLINE.

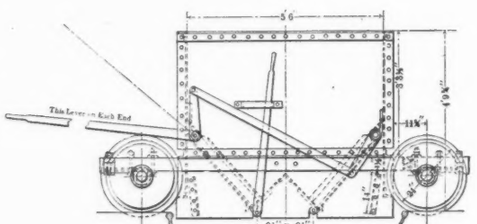


Fig. 2.—Side Elevation.

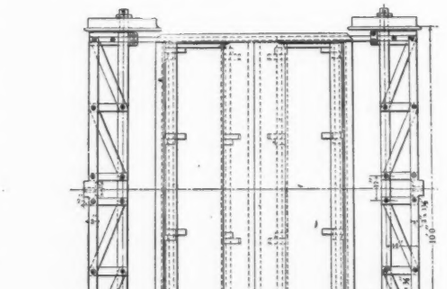


Fig. 3.—Plan.

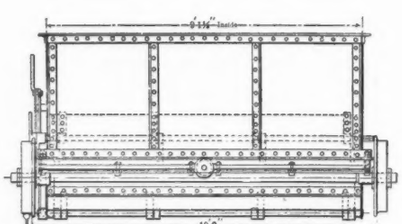


Fig. 4.—End Elevation.

PUEBLO CHARGE CAR.

The general arrangement of the plant is shown in Fig. 1. From the charge-car pit there extends an inclined trestle, on an angle of 17°, to the charge-floor level, in line with the battery of furnaces. The gauge of the track is approximately equal to the length of the furnaces at the top. The charge-car, actuated by a steel tail rope, moves sideways on this track from the charging-pit to any furnace in the battery. The hoisting drums are located at the crest of the incline, inside of the furnace building. At the far end of the latter there is a tightener sheave, with a weight to keep proper tension on the tail-rope. The charge car has a capacity of 5 tons. It has an A-shape bottom, and is so arranged that one attendant can quickly trip the bolt and discharge the car.

While the car is making its trip the charge-wheelers are filling their buggies, working in pairs, each man weighing up a half-charge of a particular ingredient. Then they separate, each taking his proper place in the line of wheelers on either side. When the car has returned, the wheelers successively discharge their buggies into opposite ends of the car. The coke is added last, to avoid crushing. The system is not strictly economical of labor, since the wheelers, who must always be ready for their car, have to wait for its return, which necessitates more wheelers than would otherwise be required. Figs. 2, 3 and 4 show the car.

A vertical section through the car filled by dumping from the two ends will show an arrangement of coarse and fine, which is far from regular. Analyzing its structure, we shall find a conical pile near each end, with a valley between them, in which coarse ore will predominate. The deflectors in the furnace, previously referred to, serve to scatter the fines as the charge is dropped in. Without them the feeding of the furnace would be a failure; with them it is successful, though not so completely as might be, the furnaces having a tendency to run with hot tops. With the battery of seven furnaces, each smelting an average of 100 tons of ore per day, the saving as compared with hand feeding, was $63 per day, or 9 cents per ton of ore, this including cost of steam, but not wear and tear on the machinery. This is distinctly a maximum figure; with fewer furnaces the fixed charges of the mechanical feed would soon increase the cost per ton to such a figure that the two systems would be about equal in economy.

East Helena System.—This was introduced at the East Helena plant of the United Smelting and Refining Company by Mr. H. W. Hixon. The plant comprised four lead furnaces, each 48 by 136 inches, with a 21-foot smelting column. They were all open-top furnaces, fed through a slot over the center, the gases being taken off below the floor. They were capable of smelting about 180 tons of charge (ore and flux) per 24 hours, using a blast of 30 to 48 ounces, furnished by two Allis duplex, horizontal,

* Abstract of a paper presented at the Mexican meeting of the American Institute of Mining Engineers. The first portion of this paper, reviewing critically the metallurgical principles involved in blast furnace operation, in order to point out why mechanical feeding would be desirable, was abstracted in our issue of January 10, under the title of "Modern Silver-Lead Smelting."

piston-blowers, air cylinders 36 inches diameter, 42-inch stroke, belted from electric motors. The Hixon feed was designed to meet existing conditions, without irrevocably cutting off convenient return to hand feeding in case of an emergency. As shown in Fig. 6 there is a track-way at right angles to the line of furnaces. The car hoisted up the incline is landed on a transfer carriage, on which, after detaching the cable, it can be moved over the tops of the furnaces

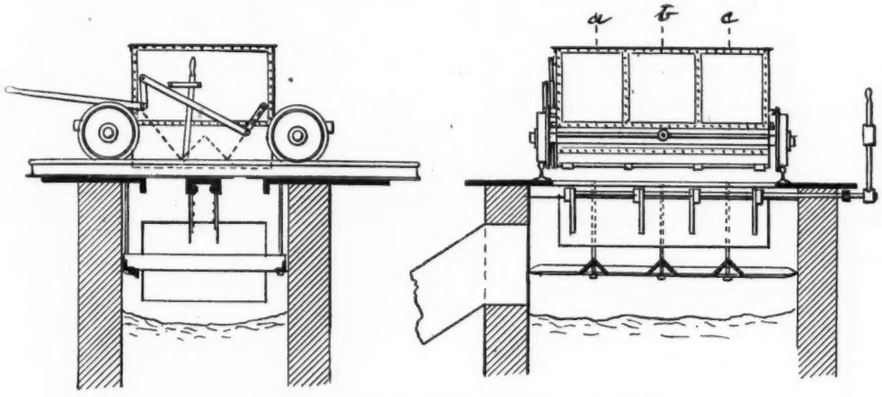


FIG. 5.—PUEBLO SYSTEM. SECTIONS OF FURNACE TOP.

by means of a tail-rope system. The gauge of the charge car is 4 feet 9 inches; of the transfer carriage, 11 feet 8 inches. A switch at the lower end of the incline permits two charge cars to be employed, one being filled while the other is making the trip. In sending down the empty car a hand winch is necessary to start it from the transfer carriage. Figs. 7 and 8 show the charge car; Fig. 9 the transfer carriage.

The charge car is 10 by 4 by 3.5 feet, and has capacity for 6 tons of ore, flux, slag and fuel, the total of ore and flux being usually 8,800 pounds. Its bottom is flat, consisting of two doors, hinged along the sides and kept closed by means of chains wound about a longitudinal windlass on top of the car. The charging pits are decked with iron plates, leaving a slot along the center of each car exactly like the slot in the furnace top. The loaded ore buggies are taken from the wheelers by two men, who carefully distribute the contents of each buggy along the whole length of the charge car by dragging it along the slot while in the act of dumping. Each buggy contains but one ingredient; they follow one another in a prescribed order, so as to secure thin layers in the charge car. The coke is divided into three or more layers.

The first few trials of this device were not satisfactory. The furnaces quickly showed over-fire, and decreased lead output, which would not yield to any remedy except a return to hand-feeding. The total charge being dropped in the center of the furnace, a central core of fines was produced, the lumps tending to roll toward the walls. This wrong tendency was emphasized by the presence of the chains supporting the bottom of the charge-car. On unwinding them to dump the car, the doors were prevented from dropping by the wedging of the chains in the charge, which in turn arched itself more or less against the sides of the car; hence the doors opened but slowly, and often had to be assisted by an attendant with a bar. In consequence of this slow opening, considerable fine ore sifted out first and formed a ridge in the center of the furnace, from the slopes of which the coarser part of the charge, the last to fall, naturally rolled toward the sides. This fact, determined during a visit of the writer in April, 1899, proved to be the key to the situation. The attendant operating the tail-rope mechanism was instructed to move the transfer carriage rapidly backward and forward over the slot while the first one-third or one-half of the charge was dropping, and during the rest of the discharge to let the car stand directly over the slot and permit the coarser material to fall in the center of the furnace. Two piles of comparatively fine material were thus left on the charge-floor, one on each side of the slot. These were subsequently fed in by hand, with instructions to throw the material well to the sides of the furnace.

The furnaces were running very hot on top when this modified procedure was begun. In a few hours the over-fire had disappeared; the lead-output was increasing; and the furnaces were running normally. This was done about May 1, 1899, and from that time until about February 20, 1900, the Hixon feed, as modified above, was continuously in operation. In October, 1898, with three furnaces in operation and hand-feeding, the labor cost per furnace was $42.06 per day; in October, 1899, with the same number of furnaces and mechanical feeding, it was $41 per day, the saving being only 0.6 cent per ton of charge.

Dwight Spreader and Curtain.—In January, 1900, the writer again had occasion to visit the East Helena plant, to investigate the reason why a certain cheap local coke could not be used successfully instead of expensive Eastern coke. Strange as it may seem, the peculiar behavior of the cokes was traced to improper feeding of the furnaces. Further study of the mechanical feeding system, then in operation for nine months, showed that it was far from perfect, and it appeared desirable to design a spreader which would properly distribute the material discharged from the Hixon car and dispense with hand-feeding entirely. An experimental construction was arranged as shown in Fig. 10. The flanged cast-iron plates around the feeding slot were pushed back and a roof-shaped spreader, with slopes of 45°, was set in the gap, leaving openings about 8 inches wide on each side. The plan provided for two iron curtains to be hung, one on each side of the spreader, and so adjusted that the fine ore sliding down the spreader would clear the edge of the curtain and shoot toward the sides of the furnace, while the coarse ore would strike the curtain and rebound toward the center of the furnace. The classification effected in this manner was capable of adjustment by raising or lowering the curtain. This arrangement was found to work surprisingly well. The first furnace equipped with it immediately showed improvement. It averaged better in speed, with lower blast, lower lead in slag and matte, and better bullion output than the other furnaces operating under the old system. The success of the spreader and curtain being established, the furnaces were provided with permanent constructions, with the only modifications that the ridge of the spreader was lowered to correspond with the level of the floor and the curtains were omitted, the feeding being apparently satisfactory without their aid. In their absence, the lowering of the spreader was a proper step, as it distributed the material fully as well, and caused less abrasion of the walls. The final form is shown approximately in Fig. 11. It has given complete satisfaction at East Helena since February, 1900, and has been adopted as the basis for the mechanical feeding device in the new plant of the American Smelting and Refining Company at Salt Lake, Utah.

Comparison of Systems.—In mechanical design the Pueblo system is better than the East Helena, being simpler in construction and operation. No time is lost in attaching and changing cables, operating transfer carriage, etc. In both systems the track runs directly over the tops of the furnaces, and this is an inconvenience when furnace repairs are under way. The Pueblo car is the simpler, and makes the round trip in about half the time of a car at East Helena, so the two cars of the latter do not make much difference in this respect. The system of filling the charge car at Pueblo is also the quicker. It may be estimated roughly that per ton of capacity it takes 2.5 to 3 times as long to fill the East Helena car; and this means longer waiting on the part of the wheelers, and consequently greater cost of moving the material, representing probably 7 or 8 cents, in favor of Pueblo, per ton of charge handled. However both systems are wasteful of labor. As to furnace results, it is believed that the better distribution of the charge in the East Helena system leads to

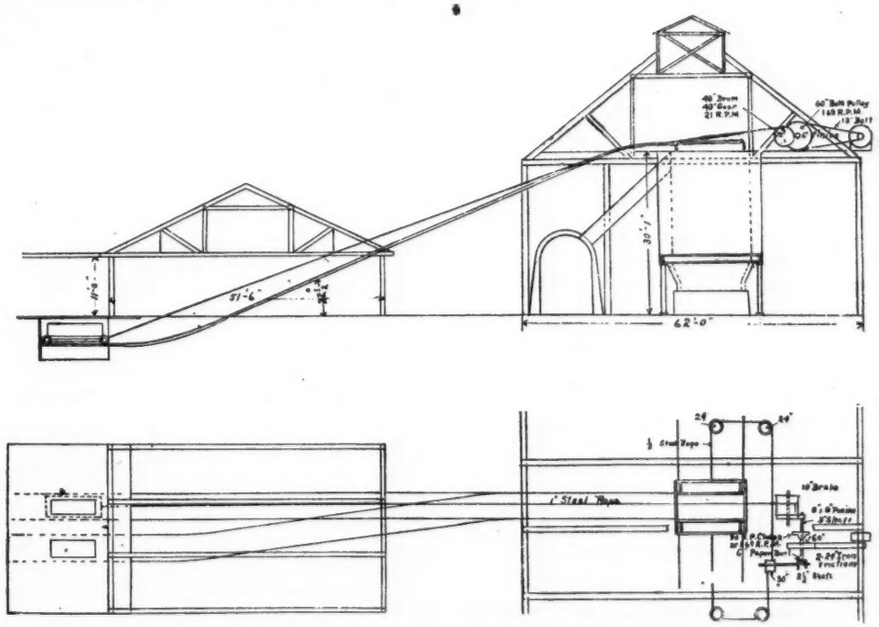


FIG. 6.—EAST HELENA SYSTEM. SECTION AND PLAN OF INCLINE.

greatly increased regularity of furnace running, less tendency to over-fire, some economy in fuel, less accretions on the furnace walls and larger metal-savings. If the half of these conclusions are true, the difference of 7 or 8 cents per ton in favor of the Pueblo system, which can be traced almost entirely to the cost of filling the charge-car, sinks into insignificance in comparison with the important advantages of having the furnaces uniformly and correctly fed.

True Function of the Charge-Car.—The radically essential feature of a mechanical feeding device is that part which automatically distributes the material in the furnace, whatever appropriate means may have been used to effect the delivery.

Taking a hasty review of the numerous feeding devices that have been tried in lead-smelting practice, we cannot but remark the fact that those which depended upon dumping the charge into the furnace from small buggies or barrows failed generally to secure a proper classification and distribution of coarse and fine, and, consequently, were abandoned as unsuccessful, while the adoption of the idea of the charge-car for transporting the material to the furnace in large units seems to have been coincident with a successful outcome. It is natural enough, therefore, that the car should be regarded by many as the vital feature. This view of the question is not, however, in accordance with the true perspective of the facts, and merely limits the field of application in an entirely unnecessary way. It must be apparent that the essential function of the charge-car is cheap and convenient transportation. The distribution of the charge is an entirely different matter, in which, however, the charge-car may be made to assist, as in the Pueblo system; or entirely distinct and special means may be employed for the distribution, as in the East Helena system.

To follow the argument to its conclusion, let us imagine for the moment that the East Helena plant were arranged on the terrace system, with the furnace tops on a level with the floor of the ore-bins. Certain precautions being observed, the spreader would give as good results with small units of charge delivered by buggies as it now does with the large units delivered by the charge-car, and the expense of delivery to the furnaces would be practically no more than it now is to the charge-car pit. The furnace-top would, of course, have to be arranged so that the buggies, in discharging, could be drawn along the slot, so as to give the necessary longitudinal distribution parallel to the furnace walls, just as is now done in filling the charge-car. The ends of the spreader, if built like a hipped roof, would secure proper feeding of the front and back.

Thus, by eliminating the charge-car, and with it the necessity for powerful hoisting machinery, with its expensive repairs and operating costs, we may greatly simplify the problem of mechanical feeding, and open the way for the adoption of successful automatic feeding in many existing plants where it is now considered impracticable.

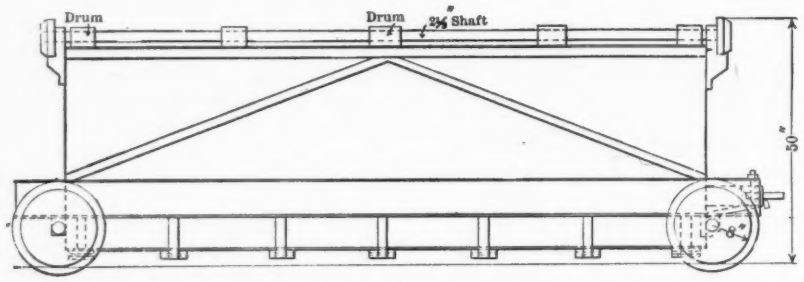


Fig. 7.—Elevation.

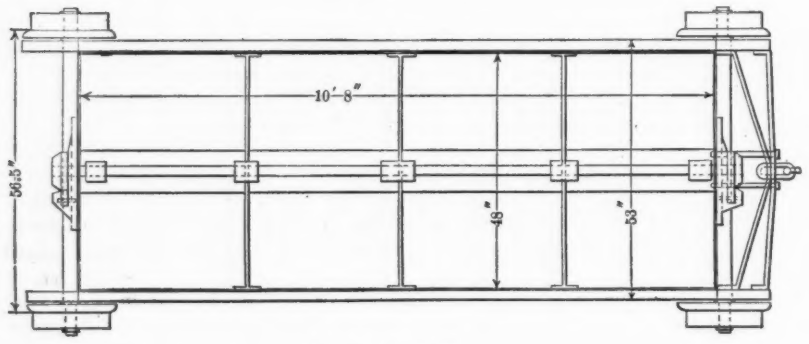


Fig. 8.—Plan.

EAST HELENA CHARGE CAR.

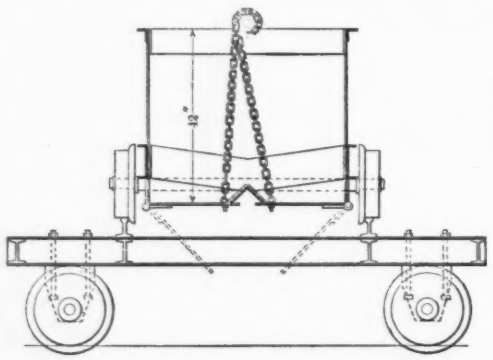


FIG. 9.—EAST HELENA CHARGE CAR AND TRANSFER CARRIAGE.

AMERICAN INSTITUTE OF MINING ENGINEERS.

The following circular from the secretary's office in New York is dated January 2, 1903:

The eighty-third meeting of the Institute, being the thirty-third annual meeting, will be held in the city of Albany, N. Y., beginning February 17, 1903.

Hotel headquarters, places of session and other information will be furnished in a later circular; but it may be said at this time that trips will be made to Schenectady, to visit the plants of the General Electric Company, and the American Locomotive Works. If the weather is propitious, a trip to the interesting plant at Port Henry, and, possibly, permission will be given to visit the Watervliet Arsenal.

The papers to be presented at this meeting should be promptly forwarded to the secretary. In view of the trip to the shops of the General Electric Company and the promise of several papers on electricity in mining, it is desired to give special prominence to this subject, and it is hoped that further papers will be offered by members whose experience with electrical apparatus enables them to contribute to this discussion.

Volume XXXI was sent out during December, to all members who had paid their dues for 1902.

The papers presented at the Mexican meeting which refer especially to that country, will be published in a separate volume, to be known as Volume XXXII. Some delay has occurred in the completion of this volume, and it will be issued early in 1903. In accordance with Circular No. 4, 1902, it will be considered as one of the publications of 1902, and will be delivered free to all members and associates who have paid their dues for that year before the first day of October. The reasons for this condition are, that Volume XXXII is an extra one sent to members free, in addition to Volume XXXI; that the book is already half printed, and the edition cannot now be increased; that a very large number of new members have been elected this year, and have paid their dues.

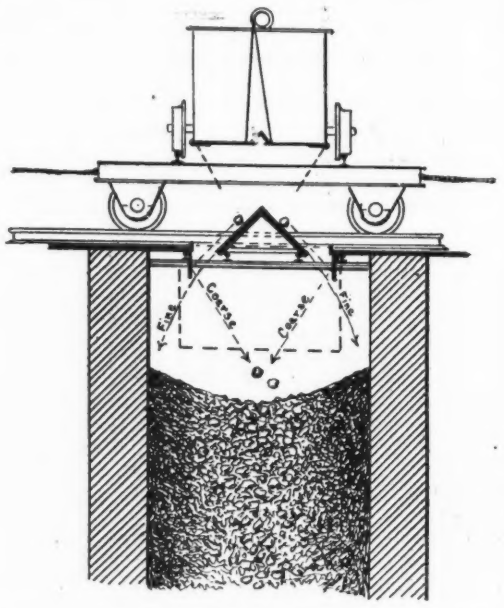


FIG. 10.—EAST HELENA SYSTEMS WITH SPREADER AND CURTAINS.

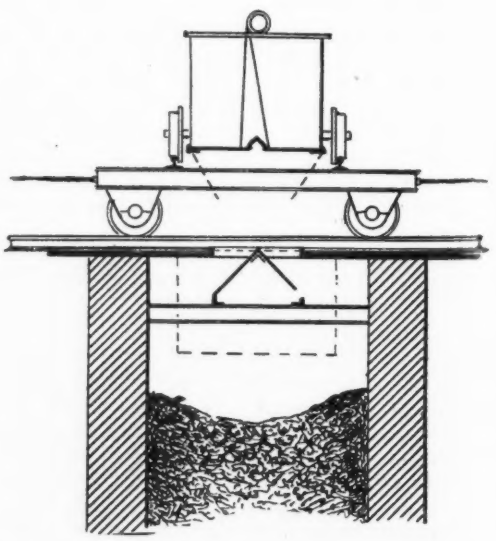


FIG. 11.—EAST HELENA SYSTEM. FINAL FORM.

If there should be any deficiency in the edition of Volume XXXII these new members will be preferred to those of earlier date who were still in arrears on October 1. Since the size of these editions was fixed, 500 members have been added to the Institute, making probable a scarcity of both volumes of the year.

The invitations received from the authorities of British Columbia, and from the members resident there, to hold a meeting of the Institute there in

August, 1903, with an excursion to Alaska, has been definitely accepted, and a circular giving more specific information will be sent out to the members early in the year. The success of this meeting, with its trip to Alaska, will depend upon the numbers attending; and it is hoped that many will be able to take part in this interesting trip.

Some 10,000 volumes are now on the shelves of the library and reading room, making a very complete library on mining and geology. Our recent accessions have not been fully catalogued, but the work is progressing rapidly. In the meantime, every assistance will be given by the librarian to members desiring to consult the books. Desks are provided for the use of members; and both resident and out-of-town members are invited to make use of the facilities. A special circular will be issued with regard to the library at a later date.

NEW MEXICO MINES IN 1902.

By CHARLES R. KEYES.

In New Mexico, the year just closed has been a very prosperous one for every branch of mining. For the future the outlook is full of promise. It is believed that development of the mining industries will henceforth make more satisfactory progress.

Several important factors have contributed to the very marked impetus imparted during the past year to New Mexican mining. These are the building of new railroads, the great development of new coal-fields, the solving of the water question, the tendency towards much deeper mining, and the settlement of standing Spanish land-grant cases.

Curiously enough, when the railroads were built through New Mexico the only object in view was to get through to the coast. With the year just past a new era of railroad building begins. The roads are being constructed with a view of developing New Mexico's resources. As a result, large mining areas heretofore completely cut off from the markets are now rendered accessible; and new surveys have been made that will open up larger tracts of valuable lands. In the number of miles of railroad constructed in 1902 New Mexico ranks well towards the top of the list of States. New roads and new branches have been built with the idea of reaching out directly for local business. The Chicago, Rock Island & Pacific Railroad has already begun to run trains through to the Pacific Coast. A new cut-off of 200 miles has been begun by the Atchison, Topeka & Santa Fe road for its transcontinental business. The new Santa Fe Central Railroad connects the Denver & Rio Grande, the Atlantic & Pacific and the Rock Island; also the Atchison with its Pecos Valley road for a direct line from the northwest to the southeast. New surveys aim at the opening up of larger fields during the current year. The Frisco, Rio Grande, Orient and two other transcontinental railroad systems all are investigating New Mexico as a field of operations in the near future.

Important new coal-fields have been entered by the new railroads, and still other new fields are awaiting development. The Chicago, Rock Island & Pacific Railroad has extended a line to Dawson in the Raton Mountains, thereby entering a field that has belonged exclusively to the Atchison, Topeka & Santa Fe. The new Santa Fe Central taps hitherto undeveloped coal-fields, which will supply a wide belt of territory. Anthracite continues to be extensively mined at Cerrillos. Numerous localities have been discovered where the coal is an excellent coking variety.

The problem of adequate water-supplies in some mining districts, which has been a source of considerable anxiety to operators, has been solved, partly by finding more water and partly by adoption of dry concentration systems, several of which are already in operation.

The tendency to deeper exploration is beginning to be productive of good results, while the rapid settlement of vast Spanish land grants throws open rich mining fields that have been for fifty years closed to miners.

Gold.—Since the drop in the silver market nearly a decade ago attention has been steadily turned to gold. As a result, the past year has witnessed unusual activity in this direction. Sierra de Mogollon, the Black Range and Sierra Blanca come in for special attention. With better railroad facilities the Black Range would experience rapid development. There are vast possibilities. Large bodies of medium grade ore exist there. Wood and water are abundant; and also timber. A number of mills are already under construction. All are cyanide propositions.

In the Mogollons much development work has been going on. There are 4 mills running; but the district is at present heavily handicapped for lack of railroads, a condition which is likely to be soon relieved. This has been a productive camp, and will shortly be again a large producer. Development work has been going on rapidly at Rosedale. The Martin Company has put down a shaft to a depth of 700 feet, and has erected a well equipped mill. A large amount of ore is said to be in sight. Pinos Altos camp, which has been a great producer, is now temporarily quiet.

Hillsboro camp has been doing development work chiefly, preparatory to more extensive operations. Considerable shipping has been done. Large amounts of ore have been blocked out.

The White Oaks District has been perhaps the most active camp in New Mexico. The deepest shaft in New Mexico is located here, yet this is only 1,200 feet down. Old Abe Mine has already produced over $1,000,000. New companies have been numerous, and new development work has been rather extensive. A number of mills have been put up. That for the Hopeful Mine is a 1,000-ton pneumatic cyanide type.

In the Nogal District considerable placer mining has been going on. The Jarillas are experiencing a general revival of the mining interests; and new developments are daily taking place.

San Pedro and Golden have been doing comparatively little during the past year.

In the Elizabethtown District great interest has been taken in placer work. Much work has been already done. Dredges have been introduced and are doing well.

The various camps about Taos have been quite active, and have taken out a good deal of ore.

Golden Cochiti, which has been quiescent for some time, has begun to be transformed. Lack of water and proper railroad facilities appear to be in a fair way to be obviated. A number of important properties are on an immense quartz vein with some talc. It is announced that a modern concentrating plant with a daily capacity of 500 tons is arranged for, and the New Mexico Northern Railroad has been organized to connect the principal mines around Bland with the Santa Fe Railroad at Thornton.

The Navajo Mine has been leased by Vivian Clark.

On account of litigation, the famous Albemarle Mine, owned by the Cochiti Gold Mining Company, has remained inactive most of the year. It is a silver and gold cyanide proposition, and the mills are the most complete in the Southwest. The properties are on an immense quartz vein with some talc. Power is transmitted 40 miles over wires from the Madrid coal-fields.

Silver.—In the Lake Valley District where all operations have been stopped for several years, numerous signs of activity have begun to show themselves. The Lake Valley Mine, which produced over $15,000,000 before the silver crisis, has recently resumed operations. The Sierra Grande Company alone own 40 mines in this neighborhood.

Hermosa, a dead camp since 1893, has begun to revive; and numerous operations have been started during the past year. The Polomas Chief syndicate has resumed work where it left off 10 years ago. Up to that time it had produced upwards of $5,000,000.

At Chloride some shipping has been done. The coming year will see a great increase. Two mills have been in operation, working an ore which contains about 12 ounces of silver to each unit of copper.

Copper.—The Burro Mountains, the San Andreas, Lordsburg and Black Range districts have shown the greatest activity during the past year. In all of these localities the production is now rapidly increasing. Developments have been rapidly going on in all of these places. In the Black Range the outlook is especially promising. Much development work has been going on through a broad belt 30 miles long, extending from beyond Grafton to Hermosa.

At Santa Rita, where there are a number of larger mines, not much work has been going on, though large bodies of ore are said to be in sight. The Hachita District has shipped a good deal; and the camps in the Magdalena Mountains and the Sierra Oscura a little. San Pedro, Golden and Cochiti districts have not been doing as much as in previous years. Some new discoveries have been made in the Sandia Mountains, the Organ Mountains and in the Sacramentos.

Lead.—Magdalena Mountains and Cook's Peak have been the chief large producers. Much development work has been going on in the various camps. At Magdalena the Graphic Smelter was in operation, and some of the other mines at Kelly and vicinity shipped regularly to the Cerrillos Smelter.

At Cook's Peak the Hooper dry concentrating plants have been in successful operation.

Zinc.—Western zinc promises soon to become a very important factor in the zinc market. Another year or two will probably see it competing with the Joplin zinc. It doubtless will permanently influence the market. For the enormous bodies of good zinc ore in New Mexico and Arizona a satisfactory method of treatment appears to have been found.

At Magdalena, the Graphic Mine has been engaged upon elaborate experiments and is now about ready to install a capacious separating plant. The adjoining Kelly Mine has not been idle, and shortly starts up as a zinc producer.

In the Cochillo District several properties have begun operations upon zinc-lead-copper ores.

Iron.—A number of important iron deposits exist in New Mexico. At Fierra are the largest operations. From this point the Colorado Fuel and Iron Company ships about a train-load a day. At Iron Mountain, in the Cochillo region, are large deposits of a good grade of hematite. It is estimated that there are over 2,000,000 tons now in sight. Large deposits have been reported in the Sierra Oscura.

Coal.—The coal mining industry of New Mexico has had the most prosperous year in its history. Besides great activity displayed in the old fields of Gallup, Carthage, Madrid and Raton, with many improvements and much new development, new fields have been opened up and many new discoveries of coal made, all of which another year will find mining going on. The most important field opened up on a large scale is near Dawson, to which the Rock Island Railroad has built a branch 120 miles long. New fields will be tapped by the Santa Fe Central Railroad. At Madrid extensive prospecting has been going on with diamond drills for anthracite. This work has been done by the Colorado Fuel and Iron Company.

The most notable new discoveries of coal are those in south-central New Mexico and in the Pecos Valley.

Oil.—In northeastern New Mexico there has been considerable excitement regarding oil discoveries. At Raton one well is down 2,600 feet. At Santa Rosa oil was struck at 700 feet.

Smelters.—The smelting works in New Mexico which have been running during the past year are those at Cerrillos, Magdalena and Silver City. The El Paso Smelter gets a good deal of the New Mexican ores. The new Pyritic Smelting Works at Lordsburg has been completed, and is now ready for operation.

PRODUCTION OF SHEET ZINC IN BELGIUM.—The rolling mill of the Société Anonyme de la Nouvelle Montagñe at Engis, which has been

idle for the last ten years by agreement with the Vieille Montagñe Company, has been purchased by a new company, the Société Anonyme des Laminoirs d'Engis (capital 400,000 francs) and is soon to be put in operation again. At the outset the production is not to exceed 3,600 tons. The Nouvelle Montagñe is the chief stockholder in the new company and will supply it with the necessary spelter and coal.

DEVELOPMENTS AT CRIPPLE CREEK.

By Chas. J. Moore.

From the numerous developments that have been made in the territory outside a circle, say, six miles in diameter, having the summit of Iron Clad Hill for its center, it would appear that no further extension of the ore-bearing district can be expected beyond the limits we now have.

This does not mean that all the mines are already opened, for very large tracts of territory within this circle remain undeveloped, in some of which new mines will assuredly be opened up. We have certainly not reached the end of new discoveries within the district.

A large impetus in this direction will be given by opening the properties of the Stratton Mining and Development Company to lessees, which is now expected very shortly.

The main question remaining is that of the permanence of the mines, and of this, during the past year, we have received very promising evidence.

The deepest mines now being worked on the different hills are as follows:

Battle Mountain.

Portland, at 1,100 feet in the Burns shaft to 1,260 feet below surface at shaft No. 2.

	Feet.
Granite	1,000
Ajax	1,000
Stratton's Independence	1,460
Strong	900
Gold Coin	1,100
Modoc	800

Bull Hill.

	Feet.
Last Dollar	1,218
Blue Bird	1,371
Logan	1,400
American Eagles	1,500
Wild Horse	1,050
Isabella	900

East Spur Bull Hill.

	Feet.
Independence T. & M. Co.	1,160
Vindicator	1,200
Lillie	1,510
Golden Cycle	900

All but one of these shafts have good bodies of ore and excellent indications for the future at the lowest levels to which they have thus far attained. Certain of these shafts, to wit, the Last Dollar and Blue Bird, show some of the richest ore ever mined in the district at their lowest levels. It has lately been asserted that this great enrichment of these veins is due to secondary deposit. By this is meant that the gold values have been largely leached from the upper portion of these veins and redeposited at a lower level, thereby enriching the original ore deposit of the vein by this amount.

A special feature of these rich ore-bodies at 1,200 and 1,300 feet below surface is the presence of copper, which is entirely absent from the upper or oxidized portion of the Cripple Creek veins. Another change in the mineral contents of the veins at the greatest depth thus far attained is the presence of lead, zinc and antimony in sulphide form and an increase in pyrites.

COAL IN ILLINOIS.

We are indebted to the Hon. David Ross, Secretary of the State Bureau of Labor Statistics for complete figures as to the coal production of Illinois for the fiscal year ending June 30, 1902.

During that year 54 counties in Illinois produced coal in some quantities. The total number of new mines opened or old mines reopened was 111, while the number of mines closed or abandoned was the same, so that there was no change in the total figure.

* Abstracted from the Cripple Creek *Times*.

At the close of the year there were 915 producing mines and openings of all kinds in Illinois; of these 332 were classed as shipping mines, that is, mines worked commercially for the trade, and 583 were small mines and openings operated entirely for the local trade. The shipping mines produced about 95 per cent of the total. The output of all mines for the fiscal year was 30,021,300 tons, of which 28,824,750 tons were reported by shipping mines, and 1,196,550 tons by small or local mines. The coal produced was divided as follows, according to the use to which it was applied: Shipped from mines for consumption at other points, 25,674,269; sold to local trade, 2,143,512 tons; supplied to locomotives at the mines, 968,384 tons; consumption for operating mines or waste, 1,235,235 tons. As to grade, the tonnage mined was further divided as follows: Lump coal, 15,041,673 tons; nut, slack, run-of-mine and all other grades, 14,979,627 tons.

The average value per ton, including all grades, at the mine was $0.942; the average value for lump coal was $1.173, and the average value of other grades, $0.709. On this basis the aggregate value of the total coal production at the mines was $28,272,050.

There were 65 mines in operation during the year in which mining machinery was used. The total number of machines of all kinds was 431. The coal undercut by machinery was 6,647,087 tons, or about 22 per cent of the total, while 23,374,214 tons were mined by hand. The average number of days of active operation for the shipping mines was 210.2 days. If all mines are included the average period of active operations was 179.6 days. The larger number of the small local mines are operated chiefly during the winter, which reduced the period of activity.

The total number of employees engaged in the coal trade during the year was 46,005, of whom 41,518 were employed underground, and 4,487 on the surface. Of these employed underground, 32,875 were classed as miners, the remainder being laborers, trammers, etc. The average price paid per gross ton for hand mining at the shipping mines was 56.35 cents, and for machine mining 44.201 cents.

The number of accidents during the year with the proportion per thousand employed is shown in the following table:

	Total.	Per 1,000 Employees.
Number killed	99	2.152
Number injured	406	8.825
Total	505	10.977

In this table only those injured are reported whose hurts were sufficiently serious to cause them to lose a month or more of time. This shows one miner killed for 303,245 tons mined, and one man injured for 73,944 tons mined. The report adds that of 99 killed, 59 left widows, and that 154 children were left fatherless by these accidents.

Among miscellaneous statistics we find that 615,282 kegs of blasting powder were used. There were 1,175 steam boilers in use, the number of mines using steam being 436. The remaining mines or small openings for the local trade were generally surface openings, operated by open cut.

GOOD WORK AT HIGH ALTITUDES.

The following tabulated statement exhibits the costs of mining, milling and transport at the Liberty Bell Mine, near Telluride, Colo. The note regarding snowslides will remind the reader that these figures refer to operations at high altitudes, the mill being at 9,000 feet and the mine at 11,500 feet above sea level. Mr. Arthur Winslow, who, at our request, gave these data, states that he expects to bring total costs down to $4.25 per ton.

Operations on the full 80 stamps basis were not reached until February, and were immediately interrupted by the snow-slide during March and April.

Ton Costs (Dry), 1901-1902.

	October.	November.	December.	January.	February.
Tons milled	6,157	6,598	5,634	5,813	7,337
Mining	$2.35	$2.22	$2.56	$2.73	$2.30
Tramming	.26	.30	.42	.41	.37
Milling	1.13	1.07	1.24	1.50	1.25
General	.98	.93	1.00	1.17	.91
Total expenses	$29,429	$29,390	$30,986	$30,727	$33,760
Per ton	4.77	4.45	5.50	5.63	4.60
Total receipts	$39,712	$46,641	$34,903	$43,941	$55,542
Per ton	.....	7.06	6.20	7.56	7.57
Profit	$10,233	$17,251	$3,917	$11,214	$21,782

March and April stopped on account of snow slides.

	May.	June.	July.	August.	September.	October.	Nov. 1902.
Tons milled	3,437	7,574	8,251	8,181	7,982	8,466	7,527
Mining	$2.89	$2.30	$1.93	$2.14	$2.24	$2.36	$2.32
Tramming	1.10	.48	.32	.38	.35	.44	.37
Milling	1.28	.92	.94	1.05	.97	.99	1.13
General	1.69	1.00	.90	.97	1.00	1.24	1.21
Total expenses	$24,477	$34,024	$32,722	$36,448	$36,546	$41,339	$37,011
Per ton	7.12	4.50	3.97	4.45	4.58	4.88	4.92
Total receipts	$26,977	$55,937	$54,962	$58,484	$60,426	$67,965	$66,343
Per ton	7.85	7.41	6.66	7.19	7.55	8.03	8.81
Profit	$2,500	$21,913	$22,240	$22,036	$23,880	$26,626	$29,332

Among general expenses are included, in addition to costs of management and superintendence, all freight, treatment and discount charges on concentrates as well as taxes, insurance, interest on bonds, and an allowance for depreciation.

THE RETIREMENT OF MR. JOHN TAYLOR.

By Our Special Correspondent.

The retirement of Mr. John Taylor from the firm of John Taylor & Sons, of London, and from active work in connection with mine management, will be universally regretted in England. Mr. John Taylor was admitted to partnership with his father and uncle in 1871, and thirteen years later became head of the firm. Though now retiring he will retain his directorships, so that his advice will remain at the disposal of the many mining companies he is connected with. The business of the firm will continue in the family, with his brothers, Frank, Robert and Edgar, and his nephews, Henry and Arthur, as sole partners. The firm have long been known as consulting engineers and mine managers, and they have done excellent work in connection with many mines, such as the gold mines in the Kolar District of India, the Cape Copper Company, the Linares Lead Mines in Spain, the Ouro Preto Gold Mines, of Brazil, and the English Crown Spelter Company, while they are the owners of the Sandycroft Foundry at Chester, where mining machinery of the highest quality is made. If it had not been for the pertinacity of Mr. John Taylor, backed up by the financial support of Sir Charles Tennant, the Kolar District would never have come to the front as a gold producer, for the first efforts at the Mysore Mine nearly twenty years ago were not successful, and the other directors were in favor of closing down. The firm have always worked harmoniously with directors and shareholders, and their reputation as employers may be gauged by the fact that members of their large staff of mining engineers, metallurgists, secretaries and accountants rarely leave their service. The mining engineers employed by the firm are usually Cornishmen, who have studied the principles and practice of mining in their native country and joined the service of the firm in their youth. We have no doubt that the excellent traditions of the firm will not be departed from in the future.

COAL MINING IN THE TRANSVAAL.—A Johannesburg telegram states that the Great East-

ern Collieries Company, which has been conducting boring operations on the new coal-fields situated in the eastern portion of the farm of Grootvlei, has struck, at a depth of 235 feet, a seam of good marketable coal, 30 feet in thickness.

THE BRISEIS TIN LEAD AT DERBY, TASMANIA.

By Edgar Rickard.

The Derby District is drained by the Ringarooma River, which rises near Ben Nevis and flows about 80 miles northward into Bass Strait. Bass Strait separates Tasmania from the mainland of Australia. For fully one-third of its course the present river formerly occupied the channel of an ancient stream, but at Branxholm (see sketch plan herewith), it has diverted and cut a new channel to the sea. This diversion was caused by a lava flow which covered the greater part of the Ringarooma, and its tributaries also. The ancient stream below Branxholm has been traced by drill-holes put down by the government. These investigations did prove the presence of tin, but the immense cap of basalt indicated that it would make it difficult to recover with profit. To the subsidence of the island, prior to the first flow of lava, is due the large accumulation of tin-bearing gravel in the ancient channel. The subsequent uplift forced the upper stretches of the river to find a new course to the sea as represented by the present river system. At the town of Derby the gutter of the ancient river is 100 feet below the modern channel, proving that the island has not yet attained its former elevation. This explanation is supported by the fact that the fall of the present river is a minimum one, 9 to 10 feet in the mile.

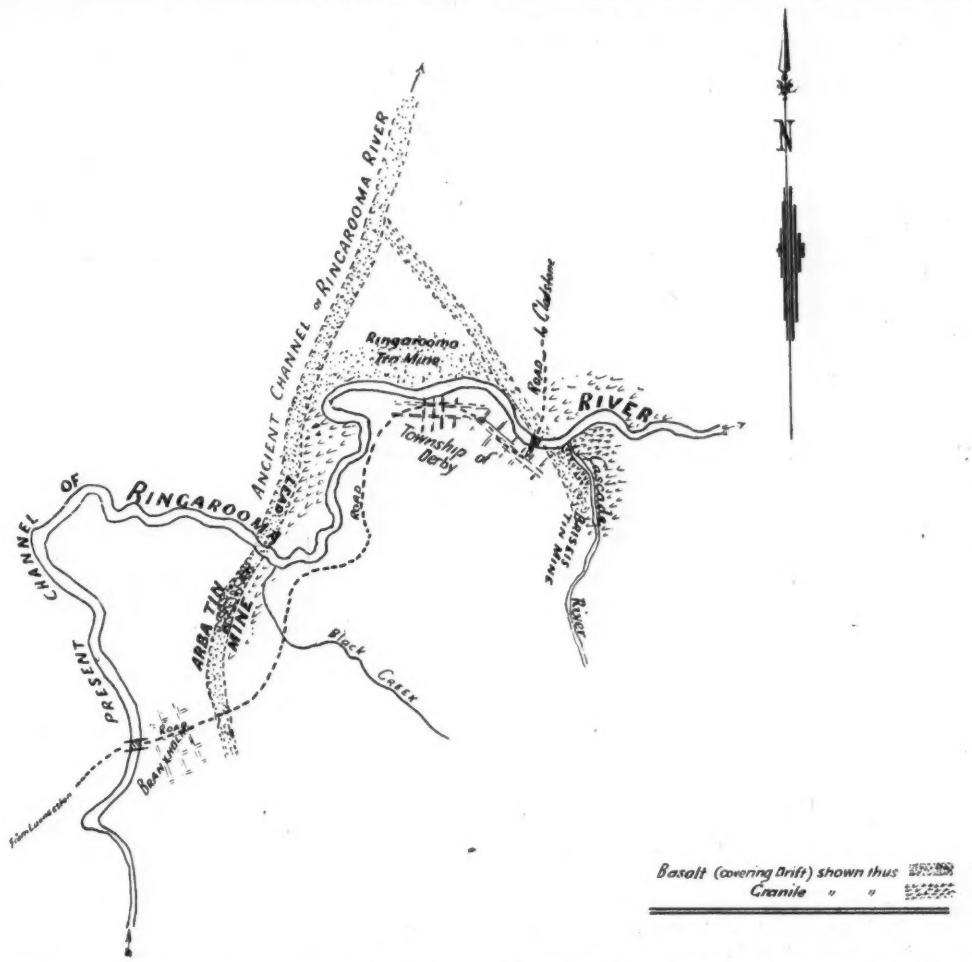
The origin of the lava flow has been a matter of dispute because of the absence of any crater-like formation in the immediate neighborhood, but the writer is of the opinion that future work on the Cascade Lead at Derby will divulge the source to have been from fissures either directly in the channel or within the rim rock. The presence of a conglomerate of gravel and basalt, in great quantities, filling nearly the entire channel in one portion of the stream, would seem to indicate this point as the probable vicinity of a vent.

The Cascade, Main Creek, Black Creek and other tributaries all played their part in bringing down the tin from the stanniferous granite at their sources.

In the accompanying sketch plan it will be seen that the modern Ringarooma in its course to the sea has eroded a channel through one of its ancient and important tributaries—the Cascade Lead of to-day. In its first attempts to reach the sea, after the outflow of lava, it must have cut through the basalt capping of this tributary, and as the island gradually rose and the fall to the sea increased, it scoured deeper and deeper. Finally it reached the gravel of the old stream and exposd its values in unmistakable signs.

The Cascade Lead has proved more important than any of the tributaries. It was discovered in 1874 by the Krushka Brothers at the point where it was exposed by the erosion of the modern river. The Krushkas worked up the channel for 26 years, following its course for nearly 1,600 feet. With the crudest of appliances * they raised and marketed nearly 5,000 tons of tinstone, which, if carefully streamed, would return 74 per cent metal. In February, 1900, the Krushkas disposed of their interest, and it was absorbed into the Briseis Tin Mines, Limited, an English company now controlling the valuable rights to almost the entire Cascade Lead from the Ringarooma southward.

The bedrock, and country rock in general, is granite. The tin-bearing gravel of the ancient channel varies in width from 300 to 600 feet, and in depth from 130 to 230 feet. The lava cap is a more or less decomposed basalt, which Mr. W. H. Twelvetrees, Tasmanian Government Geologist, describes as "an olivine basalt, in which the feldspar is mostly porphyritic and the ground-mass largely consists of small brownish crystals of augite." The basalt covers the entire channel, and varies in thickness from 40 to 100 feet. The source of the tinstone is undoubtedly from the granite to the south. It is easily observed in the gravel, and has the appearance of black powder grains. With a specific gravity of 6.97, nearly equal to that of iron, and the unusual resistance it offers to the natural agencies of decomposition, it makes an ideal substance for concentration. It is not equally distributed from the top of the gravel to the gutter, but like alluvial gold, shows more perfect concentration downward, and the increased quantity of tin in the bottom is observable even with the naked eye. The concentration seems also to have been effected by small tributary streams, which, like tail water, helped to scour the bedrock at the junction, if the channel was narrow at that point, or tended to throw the tin to the opposite rim, if it was wide and sluggish. These small creeks evidently continued to flow while the basalt was being deposited, because their junctions with the main stream are marked by layers of basalt which contain inclusions of gravel. This



SKETCH PLAN, SHOWING ANCIENT AND MODERN CHANNELS OF RINGAROOMA RIVER, TASMANIA.
(After W. H. Twelvetree.)

is locally termed "cement," and, because of its hard and tenacious character, it causes very much trouble in the removal of the overburden.

The natural difficulties facing the economical recovery of the tin are (1) the cap or overburden of basalt, (2) the lack of water for hydraulicking, (3) the poor clearance for tailings, due to the small fall in the Ringarooma, and (4) the fact that the bed of the ancient river is below that of the modern. The lack of fall makes it impossible to directly hydraulic more than 80 per cent of the gravel, and the remaining, and much richer, portion next the bedrock must be left for the elevators at some future date. Ample fall is available for the removal of the overburden. It would be impossible to remove the overburden and gravel in one operation, as the heavier pieces of basalt, requiring a greater quantity of water than the gravel, would scour the sluices and result in a great loss of tin. The method of working the deposit can be divided into three stages: (1) Removal of Overburden, or Stripping; (2) Removal of 80 per cent of the gravel; (3) Elevating bottom gravel.

The overburden consists of blocks and boulders of basalt surrounded or connected with decomposed basalt. The decomposed portion is readily acted upon by water and forms fully 60 per cent of the total mass.

The remains of a steam-shovel and an elaborate system of tracks are to be seen on the property, but few data are available as to the results obtained. Undoubtedly the extremely hard blocks of basalt occasionally found through the mass, and the depth of the overburden (40 to 100 feet), made it impossible to work by this method.

The present system is simple and efficient. The overburden is attacked with a giant under a good head, and the decomposed portion and smaller pieces of unaltered basalt are driven through the sluices into the river. The larger pieces, too heavy to be carried away by the water, are removed on small flat cars run by hand on light and temporary tracks, which can be placed in any portion of the face in a short space of time.

The face is worked alternately by water and flat cars and is divided into two parts to avoid loss of time. In some harder portions black powder is used to assist the water in disintegrating the mass, but this is rarely necessary. Ten to fifteen feet of upper gravel, which carries negligible quantities of tin, should always be included in the overburden removed. This gravel is easily acted upon by the water, and its removal serves to undermine and bring down the harder basalt above. It is planned to keep the stripping well in advance of the extraction.

The second operation includes the removal of as much drift or gravel as can be carried away directly by gravity. A two-inch nozzle under a 200-foot head will bring down 1,000 yards of gravel per week of six days, which is as much as can be taken care of with the limited supply of tail-water available.

The gravel is washed into the "paddock," which

* It is said that they hydraulicked for some time with a garden hose and bottle-neck for a nozzle.

is a temporary V-shaped inclosure, the small end opening into a sluice (tail race) 4 to 6 feet wide, according to the quantity of gravel to be removed. The paddock and sluice have no permanent bottom; the sides are merely boards nailed to short stakes, very easily removed. Boards of all lengths are continually placed and replaced in an upright position in various parts of the paddock in order to keep the gravel spread over as large an area as possible. The gravel coming from the face finds its own bottom in the paddock and sluices, and the grade is controlled by the quantity of tail-water admitted at different points along the sluice. Two men on a shift are required to keep a face going, and by constantly moving up the sluice and paddock with 10-prong steel forks, keeping the bottom well disturbed, the tin ore finds its way to the bottom. The greater part of the tin, in weight, is recovered from the paddock, for it is here that the heavier and larger pieces are caught.

Boulders of decomposed granite often occur in the face and also lumps of clay, which must be thrown out of the sluice or paddock, because it has a tendency to collect the tin on its sticky surface.

Every two days, or oftener, if the gravel carries much tin, the nozzle is taken from the face, the feed stopped, and the sluice "run down" with clear water. That is, the tin is concentrated in the bottom by shovels, and 2 or 3 inches of gravel run over it for protection, and the operation of sluicing is commenced again.

The clean-up is made every fortnight. The tin is run down for the last time, and all tail and feed water stopped. The tin is then imperfectly concentrated in a layer on the bottom. It is shoveled out of the sluice as far as any "colors" show, probably 300 feet from the face, and thrown into a tight launder which carries it, with an addition of clear water, to the streaming box. Here it is very carefully treated by hand in a box flume, 4 feet wide and 16 feet long, into which the tinstone is fed very gradually.

The operation of streaming consists in turning the tin over and over with a square mouthed shovel under the influence of a good current of clear water, the lighter gravel being washed away. The product coming from the sluices is treated three times in this way, until it is judged to be clean. This work is usually intrusted to one well-paid man, and it is remarkable with what skill and accuracy it is accomplished. In six months' time on the Briseis property, with shipments every fortnight, the returns from the smelter did not vary one point from 74 per cent; pure cassiterite containing 78.67 per cent of tin. After streaming, the cassiterite is dried, sacked, weighed and forwarded to the port of Launceston.

Up to the time of my departure the bottom gravel had remained untouched, with the exception of a small portion which had been raised at great cost by shoveling it out in a series of benches. It was the intention to allow it to remain until the overburden and top gravel have been removed, and then lift it with an hydraulic elevator. The use of this simple and efficient device does not seem to be thoroughly understood or appreciated in the district, and some more costly and less efficient method may be adopted. The bottom gravel carries the larger portion of the tin. It is much coarser and therefore more easily saved in the sluices.

ELECTRICITY FOR PURIFYING DRINKING WATER.—United States Consul-General Richard Guenther reports from Frankfort, December 8, 1902, that the city of Wiesbaden, Germany, has constructed extensive ozone water works at Schierstein for the purpose of obtaining a drinking water entirely free from pathogenic germs. The works are capable of rendering 250 cubic meters per hour at a cost of 2 pfennigs (a little less than half a cent) per cubic meter. The ozone, generated by electric discharges in an apparatus composed of metal tubes, passes upward through coarse gravel contained in towers, while the water to be sterilized flows down and arrives at the bottom perfectly germless.

THE MONTANA SUPREME COURT ON THE "PENNSYLVANIA" CASE.

The Supreme Court of Montana on December 24 rendered its decision on the appeal from the district court of one of the most important mining cases on record. This was the noted Pennsylvania case, on which the JOURNAL commented at the time of the first trial. The case was one of the numerous contentions which depend upon the extralateral provision in the mining law. It was first tried in 1899, and the proceedings before the district court occupied nearly 10 weeks. The suit was brought by the Montana Ore Purchasing Company to recover damages from the Boston & Montana Company for ore claimed to have been mined by the defendants from veins which were really the property of the plaintiff. The importance of the case may be estimated by the fact that the witnesses on the original trial for the Boston & Montana Company included such eminent engineers as Clarence King, Louis Janin, Lee Hayes, William Braden, S. W. Tyler, W. F. Word, William A. Akers, F. G. Bulkley, while for the Montana Purchasing Company there were among the witnesses George H. Robinson, Walter S. Kelly, James McFarlane, G. W. Tower, F. L. Sizer, James W. Neill and Austin H. Brown. The attorneys who managed the case for the Boston & Montana Company were T. M. Patterson, of Denver; John F. Forbis, W. H. De Witt, William Scallon and L. O. Evans, while the Montana Ore Purchasing Company's case was directed by Charles J. Hughes, of Denver; John Cotter, Robert B. Smith, J. J. McHatton, and Frank E. Corbett. The appeal was brought to court and argued in January, 1902, but the decision was not rendered until December 24, as above noted.

The accompanying diagrams, No. 1 and No. 2, show the location of the contested claims. No. 2 shows, in addition to the position of the veins, that of the fault running through the property.

It is said that an appeal to the United States Supreme Court will be taken, especially on the point of trial without a jury. It is also claimed that the Montana Ore Purchasing Company has extracted considerable quantities of ore west of the planes F, N and L, M, Diagram 1, and is therefore liable in damages.

In the District Court the case was tried before Judge Clancy without a jury, and the decision was in favor of the plaintiff. The Boston & Montana Company then applied for an injunction pending an appeal. The petition was denied on condition that the plaintiff give a bond which was raised from time to time until it reached the sum of $1,300,000. Then came the injunction and the modified injunction which is now in force.

The Boston & Montana Company again appealed from an order of the District Court denying a new trial, and it was this appeal that has now been decided.

On the point raised that a jury trial should have been allowed the court makes itself clearly understood. It says: "The plaintiff alleged title and possession in itself. The court found the allegation true. Indeed, title to the surface of the conveyed portion and of the Rarus and to the apex of the veins is admitted, as is also the possession of the ore-bodies in controversy. An effort was made to show that the possession of the latter is wrongful and therefore does not rest upon the legal title by evidence that two of the veins are so situated with reference to the end lines of the Johnstown claim that extralateral rights in the direction of defendant's ground cannot be asserted and that development of the third is not sufficient to demonstrate its continuity and identity from the apex to the point in dispute.

"An attempt was also made to show that even if plaintiff has extralateral rights in the direction of defendant's premises defendant is entitled to all of the veins below a certain point by reason of a union of them with certain veins having their tops or apices within the Pennsylvania claim, it being older in the day of its location than the Johnstown claim. Of course, if the theory of the defendant had prevailed the action should have been dismissed.

"As it did not, the result must necessarily follow that the plaintiff has the title and lawful possession of the vein on the dip and strike and is entitled to the relief demanded notwithstanding the prima facie presumption in favor of defendant's title to everything beneath its surface.

"This presumption was overturned and destroyed as soon as the identity and continuity of the plaintiff's veins from their apices to the point in controversy was established, it being made to appear also that plaintiff had a right to follow them on their dip.

"These conflicting rights dependent upon the physical and geological facts found upon an inspection of the surface and underground workings are similar in their nature to those tried and determined in actions to determine adverse claims to surface rights and are governed by the same principles. Our conclusion, therefore, is that the court committed no error in denying a trial by jury."

The question of extralateral rights is discussed at some length by the court.

In speaking of the conclusiveness of the decision of the lower court the Supreme Court says:

"The point is made that the evidence is not sufficient to sustain the findings as to the situation of the veins and their continuity and identity on their descent into the earth. The evidence is conflicting upon all the issues involved. Findings of the trial court thereon are conclusive upon this court and will not be disturbed."

Continuing the court says:

"The court having found that the portions of the vein in controversy belong to the plaintiff by virtue of its extralateral rights fixed in the decree, the perpendicular planes limiting these rights along the strike. Toward the east the limit was fixed at a plane passing through the point where the veins depart from the conveyed portion through the south side line, 294 feet west of the east end line of the Johnstown and parallel with it. Toward the west the limit was fixed at a plane passing in the direction of the line E. F. until it meets the plane of the west end line of the Johnstown, and thence in the direction of that line extended.

"The theory upon which the latter plane was thus fixed was that the owners of the Johnstown, in fixing the end line of the surface boundaries of the conveyed portion as they did, thus indicated their intention to convey to the plaintiff all the veins on their dip in the same direction and that having subsequently conveyed to the defendant the remainder of the surface of the claim, it obtained only such portion of the veins as was not previously conveyed.

"The defendant contends that the deeds under which the plaintiff obtained title do not convey any extralateral rights at all, or if they do that such rights should be limited toward the west by planes parallel with the end lines of the Johnstown, passing through the points where the different veins pass through the end line marks E. F. and extended indefinitely to the south in the direction of the dotted lines L. M. and F. N."

After specifying these deeds the court discusses their effect, that part of the opinion being especially important. as the doctrines laid down will apply in future cases. The court says:

"In determining the effect of these conveyances regard must be had not only to the terms employed in them and the surrounding circumstances, but also to the character of the property granted. An ordinary conveyance of agricultural land or of town lots described the subject of the grant merely by metes and bounds as so much of the earth's surface. Yet without specific mention the grant includes the right of support from lands adjacent thereto as well as everything above

and beneath the surface unless by apposite words contained in it some reservation is made.

"These rights conveyed without specific description are not mere incidents, but are substantive parts of that which is described to the extent that without them the subject of the grant is not susceptible of its appropriate use and enjoyment; in other words, the rights conveyed extend far beyond the specific words of description contained in the deed. Now a patent from the United States to a quartz claim conveys everything which is granted by ordinary conveyance between private parties and in many cases much more. If the conditions of the law have been observed, it conveyed in addition to what is found beneath the surface described therein all the veins to their utmost depths, the tops or apices of which are found within the surface granted, though they so far depart from the perpendicular in their descent into the earth as to extend outside of the vertical side lines of such surface. In a conveyance of agricultural lands or town lots, everything is presumed to be granted which is necessary to the enjoyment of the species of property without specific description. So by a deed to a quartz claim or a definite portion thereof as such, everything necessary to the proper and full enjoyment of that species of property will be presumed to have been conveyed, unless there be employed specific words showing the intention of the grantor to make some reservation.

"Extralateral rights are not a mere incident or appurtenance, but a substantial part of the property itself, which is the subject of the grant. They are not susceptible of a more definite description than that contained in the statute which the patent follows, because the conditions beneath the surface cannot be ascertained prior to the issuance of patent, but we apprehend that they would pass from the government to the grantee under a patent to a quartz claim as such by virtue of the provisions of the statute even though the patent contained no express reference to them whatever.

"In the first deed mentioned it was evidently the intention of the grantors to grant no less a right than they would themselves obtain under the patent which they had applied for, because the language expressly says so. They were conveying a portion of the Johnstown claim including a definite fixed portion of the apex of the vein along its strike. They must therefore be conclusively presumed in the absence of words of express reservation to have intended to convey whatever other substantial property rights were attached to such portions of the apex. The immediate grantor of the plaintiff therefore obtained all the rights which he would have obtained by a patent directly to himself.

"The second deed omits any reference to the veins or the dips, spurs and angles thereof, but it is apparent therefrom that the parties were dealing with the property as a quartz mining property, that is, a definite portion of Johnstown quartz lode mining claim, and from what has already been said the presumption must obtain that the grantor intended to part with all his right, title, interest and estate therein of whatever character and description.

"Hence the inevitable conclusion that the plaintiff is vested with the rights obtained by the patentees of the Johnstown claim and have such rights upon the veins, extralaterally, as belong to the apex embraced within the end line of the conveyed portion. The fact that the end lines of the conveyed portion were fixed as they were does not, standing alone, justify the conclusion that the grantors of the plaintiff intended thereby to limit or control in any way the extralateral rights as between the grantees of the different portions of the claim."

The court further says:

"In the absence of an agreement, expressed or implied, we think the character of the property should control, and that only such extralateral rights are conveyed as appertain to the portion of the apex, embraced within the boundaries of the conveyed portion bounded by planes parallel with the end lines of the claim as patented. This theory seems to us to be entirely just and at the same time to avoid the result that would follow from the view contended for by the plaintiffs, that is, that the extralateral rights conveyed are left to depend entirely upon the subsequent ascertainment of the direction of the dip."

The defendant offered in evidence the notice of location of the Pennsylvania claim in connection with the Merue conveyances, before the patent from the original locators to the defendant, all of which were excluded. That evidence was offered in support of the defendant's theory that this claim was located before the Johnstown or the Rarus claims and that there are veins having their apices within the Pennsylvania claim which in their descent into the earth unite with those having their apices in the Rarus and Johnstown claims, thus giving defendant title to the whole vein below the point of union.

In refusing to allow the plaintiff costs the court says:

"In the judgment entered by the lower court the costs of the action were awarded to the plaintiff. In the bill or memorandum filed by plaintiff under the requirements of section 1867 of the code of civil procedure there were contained items claimed as necessary disbursements amounting in the aggregate to $324,134. The defendant objected to many of the items claimed as illegal. After a hearing, the court made an order disallowing a portion of the bill and directing judgment for the balance amounting to $265,015. Complaint is made that four of the items so charged were not taxable as costs and should have been disallowed. We think this contention is just. Costs, as costs, were not recoverable at the common law. Under the rule which has always prevailed in this jurisdiction no costs can be allowed either party except as are provided for by statute."

In conclusion the court says:

"The order denying a new trial is affirmed. The cause is remanded with directions that the court below modify the decree by disallowing the items of costs complained of and by limiting the extent of plaintiff's extralateral rights toward the west by fixing the west boundary planes on the direction of the line L. M. as indicated on Diagram 1 at the points where the different veins pass through the line E. F. When so modified the decree will be affirmed. The defendant will recover one-half of the costs of appeal."

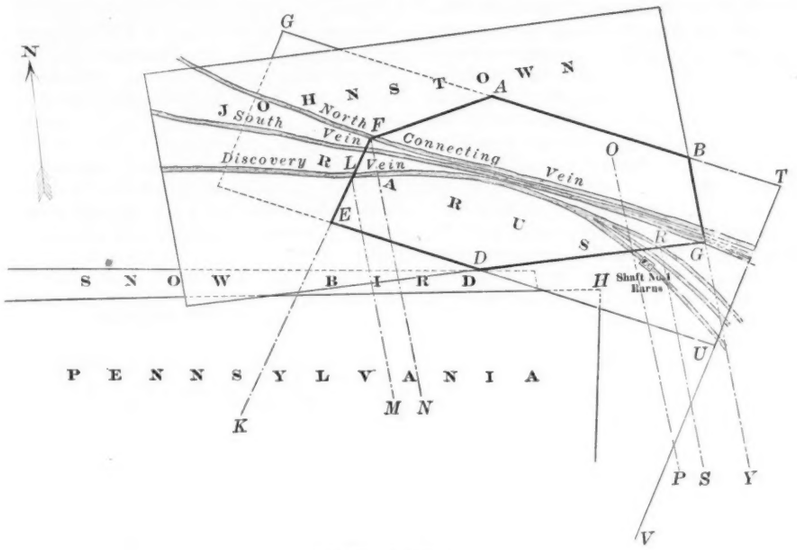


DIAGRAM NO. 1.

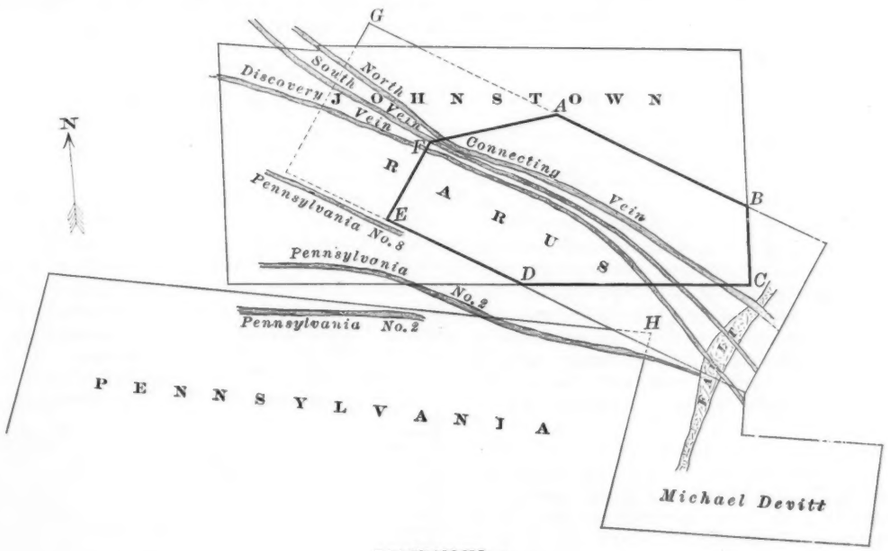


DIAGRAM NO. 2.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

CONSTRUCTION OF STATUTE CONCERNING COAL MINES IN CHOCTAW NATION.—The collection of royalties due and owing to the lessors of coal mines in the Choctaw Nation for coal mined under valid leases prior to the Curtis act of June 28, 1898, was not prohibited by the provisions of that act, making it unlawful for any person after the passage of such act to demand or receive royalty or for any one to pay such royalty to any individual.—Southwestern Coal & Improvement Company v. McBride (22 *Supreme Court Reporter*, 763); Supreme Court of the United States.

WHEN WRITTEN CONTRACT CANNOT BE VARIED BY PAROL AGREEMENT.—Where parties enter into a contract for a lease with option to purchase placer mining claims, reduce the same to writing and state the details therein, and it appears to be complete upon its face, such contract cannot be defeated by showing a contemporaneous oral agreement, not made after the execution of such contract, and there is no allegation of fraud or mistake in the procuring or execution of such contract.—Tyson v. Beill (70 *Pacific Reporter*, 791); Supreme Court of Idaho.

HARMLESS ERROR IN APPLICATION AND PATENT TO MINING PROPERTY.—All but one of the co-owners of a mining claim applied for a patent, presenting to the land office, where the entry was made, abstracts of title showing their interest, and also that of their co-owner. On appeal to the Department at Washington a patent was obtained; no mention being made therein of the co-party, who had in the meanwhile parted with all of his interest to one of the other parties to the patent. It was held that fraud for not including him in the application, at the time of the original entry and relocation for lack of proof of his transfer of interest at the time of the final application were alike harmless to him thereafter.—Wetzstein v. Loogey (70 *Pacific Reporter*, 717).

EVIDENCE ADMISSIBLE TO SHOW UNDERSTANDING IN TRANSFERS OF CLAIM.—In an action attacking a claim to mining property, based on a lost deed to the defendants' predecessor in title, evidence was introduced tending to show that the prior owner, from whom both parties claimed, in fear of an adverse decision in a former litigation, which occurred subsequent to the alleged lost deed, relocated the claim and redeeded it to defendants' predecessor the same interest therein as the defendants claimed in their lost deed. It was held that though the subsequent location was abandoned the evidence was admissible as showing the understanding of the former owner in regard to the claim of the defendants' predecessor.—Wetzstein v. Loogey (70 *Pacific Reporter*, 718).

MINING CORPORATIONS: STATE DECISIONS CONCLUSIVE ON FEDERAL COURTS.—A State may require the consent of the stockholders of a foreign mining corporation as a necessary prerequisite to the sale or encumbrance of the mining ground owned by it within the State, as such a requirement is not a regulation of the internal affairs of the corporation, but has reference to the conduct by it of its business. The decision of the Supreme Court of California, that any person who connects himself with the title of a mining corporation may take advantage of the law of that State (Act April 30, 1880) prohibiting the directors of mining corporations from selling or encumbering its mining ground unless ratified by the stockholders, is binding on the Federal courts. Those courts are concluded upon the question as to how an encumbrance by a mining corporation of mining ground in California may be ratified by the stockholders, by a decision of the Supreme Court of that State that the manner of ratification prescribed by said law is conclusive.—Wiliams v. Gaylord (186 *United States Reports*, 157); Supreme Court of the United States.

REQUIREMENTS AS TO VENTILATION OF COAL MINES IN WASHINGTON.—In an action for the death of a miner from black damp an instruction is proper, which after quoting from the laws of Washington (Ballinger's *Annotated Codes and Statutes*, Sec. 3165) providing that the owner or operator of a coal mine shall provide sufficient and good ventilation for the employees of the mine, and said air must be made to circulate through it, continued: The purpose of the law is to provide a reasonably safe place to work in, and that the ventilation at the place of working shall be such as to maintain a man reasonably safe from dangerous gases, and this is the positive duty imposed on the operator and owner, and for neglect of this duty the law holds him liable if damages result therefrom, it matters not who provided or assisted in the work of ventilation, and if it was necessary to keep the chute open as an airway to make a good and sufficient ventilation in another chute and part of the duty of the loader was to keep the chute clear he was a vice-principal and not a fellow servant of a miner who was killed. And coal mine operators are liable for the death of a miner from insufficient ventilation though the act of a fellow servant of such miner may have concurred in producing the result. It is peculiarly within the discretion of a trial court to allow experienced miners to testify to conclusions in the nature of expert evidence on a showing of competency satisfactory to such court. Testimony of such experienced miners that about the time of the death of such miner the chute in which he worked contained bad air and was insufficiently ventilated, and that complaints as to same were made to the managers before the accident is competent to show notice to the operators of such conditions. The care required of an operator does not apply to workmen as to methods of work in the operation of a mine, for the miner assumes only such risks and dangers from same as are open and apparent to him or to one in his position, and which are necessarily incident to his employment.—Czarecki v. Seattle & San Francisco Railway & Navigation Company (70 *Pacific Reporter*, 750); Supreme Court of Washington.

ABSTRACTS OF OFFICIAL REPORTS.

United States Steel Corporation.

The United States Steel Corporation has made public a preliminary annual statement for the year ended December 31 last. The statement does not permit of comparisons with the previous year, as the fiscal year was changed in May last so as to make it end with the calendar year instead of on March 31. A complete annual report with general balance sheet, financial statements, statistics, etc., will be submitted at the annual meeting in April, or as much earlier as it can be furnished. The statement of earnings just issued is as follows by months:

January	$8,901,016
February	7,678,583
March	10,135,858
April	12,320,766
May	13,120,930
June	12,220,362
July	12,041,914
August	12,972,729
September	11,930,846
October	12,652,707
November	10,686,906
December (estimated)	8,000,000
Total net earnings	$132,662,617

The general statement of results for the year may be summed up as follows:

Net earnings, as above	$132,662,617
Sinking funds, bonds of subsidiary companies	$624,064
Depreciation and reserve funds	13,904,119
Special improvement fund	10,000,000
Interest on U. S. Corp. bonds	15,200,000
Sinking fund U. S. Corp bonds	3,040,000
Total deductions	$42,768,183
Net balance	$89,894,434

From this balance dividends were paid as follows: Preferred stock, 7 per cent, $35,720,179; common, 4 per cent, $20,332,690. This made a total of $56,052,869, which, deducted from the balance shown above, left undivided profits for the year amounting to $33,841,656. This amount is applicable to increase the depreciated reserve fund accounts or to new construction or surplus.

The net earnings above shown are the amount remaining after deducting, in addition to working expenses, the cost of ordinary renewals and maintenance of plant, also interest on bonds and expenses of subsidiary companies. The statement of current liabilities and assets shows a total of assets amounting to $222,367,839; the bills payable and other liabilities, $49,311,863, leaving a balance of assets amounting to $173,055,976. The cash on hand was $54,724,106. The amount of bonds of the company in the hands of the public at the close of 1902 was $363,745,802. A supplementary statement gives the orders on hand on December 31 as 5,347,253 tons of iron and steel, which is an increase of 849,504 tons over the quantity reported at the beginning of the year.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

The Cost of Production. By Charles J. Watts. Muskegon, Mich., and Chicago; the Shaw-Walker Company. Pages, 64.

Economics of Forestry. By Dr. Bernhard E. Fernow. New York; Thomas Y. Crowell & Co. Pages, 520. Price, $1.50 net.

The Art of Illumination. By Dr. Louis Bell. New York; the McGraw Publishing Company. Pages, 340; illustrated. Price, $2.50.

Thonindustrie Kalendar, 1903. Berlin, Germany; issued by the *Thonindustrie Zeitung*. Part I, Calendar, 400 pages; Part II, Text, 450 pages.

Perspective Drawing. Prepared by Prof. W. H. Lawrence. Chicago; American School of Correspondence at Armour Institute of Technology. Pages, 72; illustrated.

From Steelton to Mandalay. Prepared and issued by the Bridge and Construction Department of the Pennsylvania Steel Company. Steelton, Pa. Pages, 80; profusely illustrated.

Report of the United States Commissioner of Education. 1901. Volume I. Dr. William T. Harris, Commissioner. Washington; Government Printing Office. Pages, 1,216.

The Mining Industry in North Carolina During 1901. By Joseph Hyde Pratt. Prepared for the North Carolina Geological Survey. Raleigh, N. C.; Public Printer. Pages, 104.

A Text-book of Field Astronomy for Engineers. By Prof. George C. Comstock. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 212; illustrated. Price, $2.50.

Combustibles Industriels. Houille, Petrole, Lignite, Tourbe, Bois, Charbon de Bois, Agglomeres, Coke. By Felix Colomer and Charles Lordier. Paris, France; Veuve Ch. Dunod. Pages, 560; with 185 illustrations. Price (in New York), paper, $6.25; boards, $6.75.

BOOKS REVIEWED.

The Battle with the Slum. By Jacob A. Riis. New York; the Macmillan Company. London; Macmillan & Co., Limited. Pages, 466; illustrated. Price, $2.

The author of this book has for years been engaged in what might be called by analogy a very difficult and discouraging kind of mining—in the lowest strata of human society in a great city. His dividends have been found in such improvement as he has aided in bringing about in the conditions of life among the poor in New York. The sketches col-

lected in this book are extremely interesting, and it is well known that Mr. Riis' pen has given efficient aid to many measures of reform. He writes plainly, directly, forcibly and with a lively sympathy. His evident truthfulness impresses the reader, and one cannot go through the book without feeling an interest in the work of the author and his colaborers.

The Evolution of Mine Surveying Instruments. By Dunbar D. Scott and others. Reprinted from Volumes XXVIII-XXXI of the *Transactions* of the American Institute of Mining Engineers. New York; published by the Institute. Pages, 324; illustrated. Price, cloth, $3.50; half morocco, $4.50.

In this volume have been collected the original paper on the subject prepared by Mr. Scott, with the discussions and additional contributions called out by that paper. The whole forms a valuable treatise on Mine-Surveying instruments; and thanks are due to the Secretary for thus collecting and publishing in one convenient volume the papers which in their original form were scattered through four volumes of the *Transactions.* Besides Mr. Scott papers are contributed by J. B. Davis, H. D. Hoskold, Benjamin Smith, Lyman and John H. Harden, with short discussions by many others.

It is not to be supposed that these papers and discussions close or complete the subject. The discussion is still going on, for—as Dr. Raymond says in his brief preface—"the subject is one of those which will never be exhausted"; and contributions to it will be made, doubtless, by practising mine surveyors and the designers and makers of surveying instruments as long as there is room for possible improvements—that is, as long as mine surveys are made and instruments are required. Nevertheless, such a summing up as is contained in this volume is of great use, and will be welcome to the profession.

Practical Gold Mining. Its Commercial Aspects. A Collection of Statistics and Data Relating to Gold Mining and Gold Mining Finance Companies. By William S. Welton. London; W. R. Russell & Co., Limited. Pages, 208. Price (in New York), $5.25.

This volume is intended chiefly to aid investors and to furnish them with data which will help them to discriminate between the class of purely speculative ventures, on the one hand, and the class which presents elements of commercial success on the other. The first three chapters treat generally of the commercial side of gold mining, with general data relating to successful operations. The following chapters treat of Gold Mining Risks: Working Capital; Mining Costs; Vendors; Gold Mining Finance; Mining Finance Companies; the Determination of the Present Value of a Mine. This occupies one-half the book; the remainder is taken up by condensed data—chiefly in tabular form—relating to gold mining companies registered in London, and whose stocks are dealt in on the London Exchange. While it is thus mainly an English book, and intended for British investors, it contains some advice on the commercial side of gold mining, which is good everywhere. It is not a technical book at all, nor is it intended to be so, but a commercial one, dealing with mining and metallurgical methods only, so far as they directly affect costs and profits. It has been carefully written and embodies a great mass of facts and data.

The Civil Engineer's Pocket-book. Eighteenth edition. By John C. Trautwine. Revised by John C. Trautwine, Jr., and John C. Trautwine, 3d. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 1,080; illustrated. Price, $5.

It is not at all necessary—nor is it practicable—to criticise a work which long use has so firmly established in the estimation of engineers. *Trautwine's* is known and used so widely that every engineer in practice holds his working library incomplete without it. All we can do is to state that in this new edition more than 370 pages of new matter have been added, and a large part of the rest thoroughly revised and much of it rewritten. The matter of the book has been rearranged. To some of the principal changes we cannot do better than call attention in the words of the preface:

"The articles on arithmetic are considerably extended, notably by the addition of new matter relating to interest, annuities, depreciation, etc., including several tables. The new and greatly enlarged table of five-place logarithms is arranged in a somewhat novel form. In constructing this table, the effort has been to obviate the difficulty, present in all tables where the difference between successive numbers is constant throughout, that the differences between successive logarithms of the lower numbers are relatively very great. In the new table the differences between logarithms are much more nearly constant. For convenience in rough calculations, the old table of five-place logarithms, on two facing pages, is retained.

"The Conversion Tables contain the equivalents of both English and metric units, and of each of these in terms of the other; but, owing to the extreme ease with which one metric unit may be converted into others of the same system, it has been unnecessary to burden the table with many of the metric units. The tables have been separately calculated by at least two persons, and their results compared and corrected. One of these results has then been used by the compositor in setting the type, and the proofs have been compared with the other.

"The new article on the location of the meridian is much more complete than its predecessors, and a new table of azimuths of Polaris, corresponding to different hour-angles, has been added.

"Perhaps the most radical and extensive of all the changes in this edition are those in the articles on Statics, on Beams and on Trusses. These have been almost entirely rewritten and completely modernized. Under Trusses, modern methods of calculating the stresses in and the dimensions of the several members, and modern methods of construction, are explained, and several modern roofs and bridges are described and illustrated. One of the most notable features in the new article is the digest of prominent modern specifications for bridges for steam and electric railroads and for highways. The articles on the strength of beams are greatly simplified and brought into harmony with modern methods of dealing with that subject.

"In preparing the digests of specifications for iron and steel, use has been made of the specifications recently adopted by the American Section of the International Association for Testing Materials; while those of the American Society of Civil Engineers and of the recent report of a Board of United States Army engineer officers have been similarly used in connection with cement.

"The price list of engineering materials and appliances has been prepared merely as a useful guide in roughly estimating the approximate costs of work, and it is not to be supposed that it can, in any important case, take the place of personal inquiry and correspondence with manufacturers or their agents, nearly 700 of whom are named in the accompanying list of names and addresses of manufacturers, etc. From its first appearance, the *Pocket-Book* has undertaken to give prices of certain manufactured articles, and addresses of those from whom they may be obtained; but these, scattered as they were throughout the volume, were necessarily desultory, and limited in their extent and usefulness. It is hoped that the present articles will be found at least an acceptable substitute for them."

The new edition has evidently been prepared with the same scrupulous care which marked its predecessors. Advantage has been taken of experience, and the revisers have had the benefit of advice and assistance from many engineers, to whom full acknowledgment is made.

CORRESPONDENCE.

Communications should invariably be accompanied with the name and address of the writer. The initials only will be published when so requested.
Letters should be addressed to the EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

The Hunt Leaching Process.

Sir.—I have read an article in your issue of December 20, 1902, on the treatment of cupriferous gold ores with cyanide of potassium, referring to B. Hunt's method of leaching ores with an ammoniacal cyanide solution.

I wish here to refer to my book on the "Ammonia Process," page 14—specifications of United States patent No. 656,544—and page 36. On these pages I described substantially the whole of Mr. Hunt's process, and therefore I cannot understand why no credit is given to me, as I secured patents and worked the process on a large scale many years before Mr. Hunt obtained patents on the same subject. The author of the article in your JOURNAL, as an assayer and leacher, knows that in first leaching gold-bearing copper ores with ammonia, some ammonia will be retained in the tailings—and this is mentioned in my book—and if cyanide of potassium is then added, an ammoniacal cyanide solution is formed. I further specified that I obtained the precious metals by electrolysis, thus covering the whole of Mr. Hunt's method of leaching.

You will do me a favor by publishing these remarks, in order that the matter may be set right.

H. HIRSCHING.

San Francisco, Jan. 1, 1903.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Titanium in Iron Ores.—I read in a recent report that certain magnetic sands contain 0.8 per cent titanium. Is this percentage large enough to materially affect their value as iron ores? In ordinary practice what is the maximum percentage of titanium permissible in otherwise pure iron ores?—J. H. S.

Answer.—Probably even 0.8 per cent of titanium would affect the value of iron ores with most buyers. The majority object to any at all. There is, however, no absolute limit as to the maximum percentage allowable. The purpose for which the iron to be made is intended would make some difference.

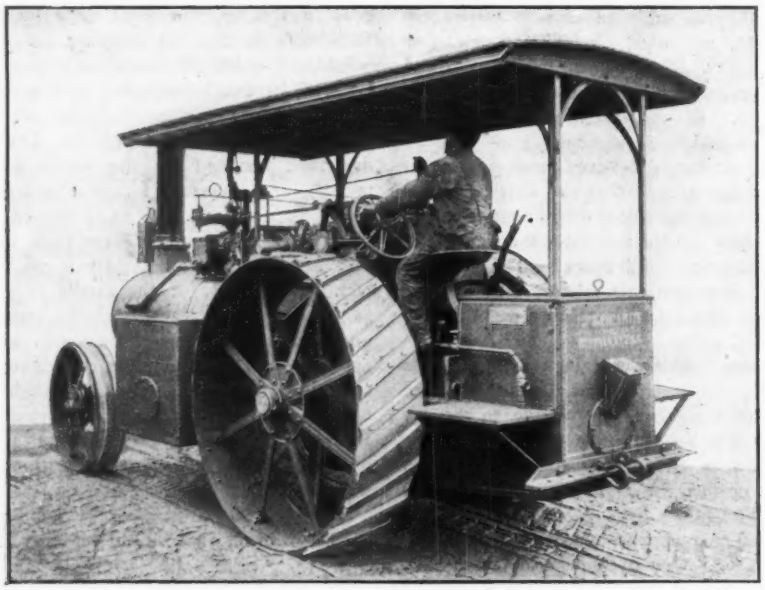
Mr. Auguste J. Rossi, of 35 Broadway, New York, has done a good deal of valuable experimental work with titaniferous iron ores, and can probably speak with more authority on this point than anyone else.

Normal Price of Spelter.—I have seen in your columns and elsewhere references to a normal price of spelter. What would you consider such a price?—T. D.

Answer.—Generally speaking, the normal price of a metal is such a value as will not limit its use on the one hand; and on the other, will give the miners and smelters sufficient profit to induce them to turn out the metal freely and to encourage prospecting and the development of new supplies. With regard to the price of spelter, Mr. Walter Renton Ingalls' *Production and Properties of Zinc* says:

"Notwithstanding the important applications which zinc finds in the arts, it cannot be considered as indispensable metal, like copper for example, wherefore its price is limited; that is to say, if the price rises above a certain figure the consumption is immediately restricted. This was demonstrated in a striking manner in the United States in 1899, when

the price of spelter rose to 7 cents, New York, and was for a long time higher than 5 cents. At those figures the consumption of spelter was much restricted, especially in the sheet zinc and galvanizing industries. With respect to the latter there is a certain difference between the price of black, painted corrugated sheets and galvanized sheets at which the consumer gives the preference to the galvanized, but when that difference is exceeded he will take the painted sheets instead. The difference in 1899 exceeded the parity of choice, wherefore the demand for galvanized sheets fell off. In the sheet zinc trade a high price for zinc leads to the use of other metals as substitutes. In the zinc-white trade it increases the difficulty of competition with white lead, if the price of the latter be not high in proportion, and in any case gives headway to the use of barytes and other inferior substitutes. Except for the manufacture of brass there are few important uses for which zinc is an absolutely indispensable metal, and its price is therefore limited to the point at which consumers will give it the choice in preference to substitutes. With a price for spelter of 4 to 5 cents per pound at New York there ought to be a large consumption at an increasing rate corresponding to the industrial development of the country. A price of 5 cents per pound or over cannot be expected except for short periods when there may be a brisk demand and a shortage in the supply; at least not under the existing conditions of abundant ore supply and cheap fuel. The average price for the 10 years, 1891-1900, was 4.36c at New York, according to the quotations of the ENGINEERING AND MINING JOURNAL, and 4.16c at London, according to the statistics of Henry R. Merton & Co., reduced to United States currency at par of exchange."



BUFFALO-PITTS ROAD LOCOMOTIVE.

THE BUFFALO-PITTS ROAD LOCOMOTIVE.

We illustrate herewith a road locomotive, built by the Buffalo-Pitts Company, Buffalo, N. Y. The factory, dating back to 1837, has had large experience in building traction engines, having turned out over 5,000 of them, for use in all sorts of climates, on all kinds of roads, in many different countries. The machine shown is built especially for mining and lumber camps, for contractors, and for all who are regularly engaged in hauling heavy loads of any kind of merchandise over ordinary roads. These machines have been tested in most unfavorable climates, with roads frozen hard and much ice, and also in muddy marshes.

An ordinary team of horses will pull, including the wagon, about three or four tons. This engine will pull from 20 to 30 tons, according to the grade. It has a speed of from 2 to 6 miles per hour, according to load and grade. The grates burn either wood or coal, and are rocked by a lever from the platform. The tanks carry 400 gallons of water, and about 1,000 pounds of coal. The tanks can be refilled quickly, if necessary, by an ejector from pools and streams along the roadside.

The engine is of double-cylinder type, with cylinders 6⅝ inches diameter, 10 inches stroke. The cylinders are encased with live steam, thus preventing condensation. With 80 pounds mean effective pressure on the piston and 500 feet of piston speed per minute, the engine will develop 83 horse-power. All the shafts and axles are made of high-grade forged steel, running in long boxes lined with babbitt metal, with ample provision to take up wear. Links and their connections are case-hardened where wear takes place. The gear is of large diameter and wide face, made of steel. A compensating gear is used on the second countershaft, thus enabling the engine to turn sharp corners without slipping the road wheels. The first gear, both driver and driven, is cut from solid stock, as the speed is rather high for cast teeth. The road wheels have each a gear attached to their rims, thus removing the tension from the axle.

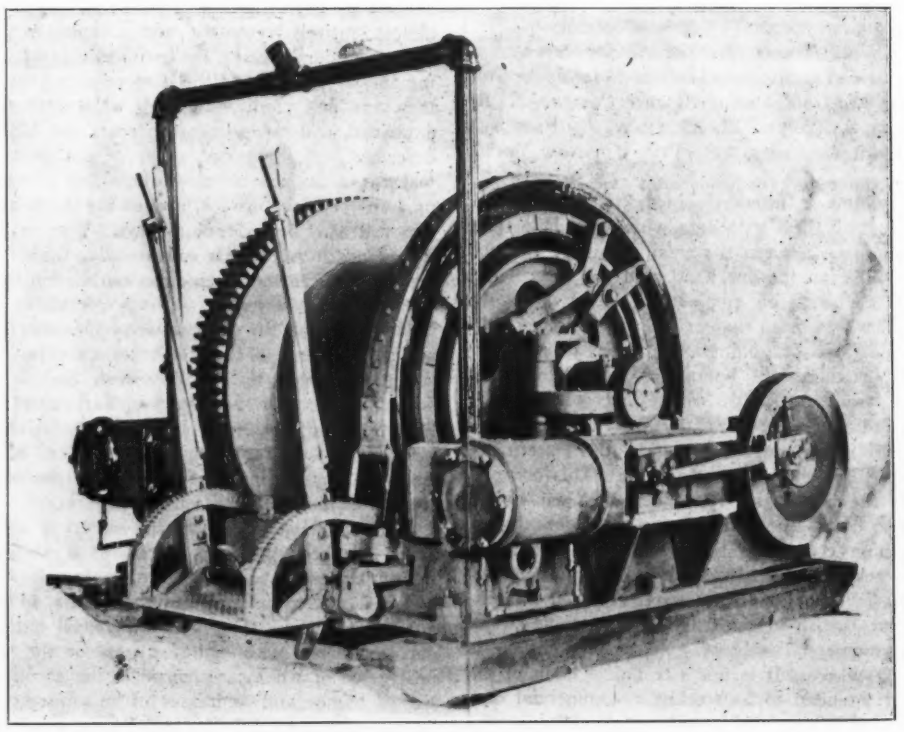
The road wheels have steel spokes and rims. The rim is reinforced on the edge next to the boiler with angle steel. The spokes are flat, and riveted to the hub and rim, the hub being of malleable iron. Diameter of wheel is 72 inches. Standard width of tire, 20 inches, but this can be made wider to suit special conditions. The width outside of wheel is 8 feet, and distance between front and rear axles 11 feet. The weight of engine in working condition is 11 tons.

It is claimed that with this engine the cost of hauling per ton is much lower than when horses are used under similar conditions of road, etc.

A HOISTING ENGINE BUILT IN ARIZONA.

The accompanying illustration shows one of the first hoisting engines built in the territory of Arizona. The first concern in that territory to make mining machinery is the Arizona & Sonora Manufacturing Company, whose shops are at Nogales. The engine shown has 8 by 10-inch cylinders, and other sizes are also built. The engine is a double-cylinder drum hoist of approved design, and while it presents no especial features, is a compact machine, showing excellent workmanship. The crank-shafts, drum-shafts, connecting-rods and piston-rods are made of hammered mild steel. The bearings are large, and every proportion is made to secure safety.

We are pleased to know that the manufacture of mining machinery is well established in Arizona, and we trust that the engine shown will be the precursor of many others to be built in that Territory.



ARIZONA & SONORA MANUFACTURING COMPANY'S 8x10-INCH DOUBLE-CYLINDER HOISTING ENGINE.

THE SAULT STE. MARIE CANAL TRAFFIC

The traffic of Lake Superior, as shown by the passages through the canals at the Sault Ste. Marie last year, far exceeded that of any previous year. The official statement for the full season of navigation shows the following figures for two years:

	1901.	1902.	Changes.
Vessels passed through..	20,041	22,659	I. 2,618
Number of lockages ..	11,321	12,846	I. 1,525
Net tons freight	28,403,065	35,961,146	I. 7,558,081
Av. vessel load, tons...	1,417	1,587	I. 170

Of the freight carried in 1902 there were 5,685,157 tons, or 15.8 per cent of the total, west bound; and 30,275,989 tons, or 84.2 per cent, east bound. The total increase in freight was 26.6 per cent.

Vessel passages in 1902 were thus divided: Steamers, 17,069; sailing vessels and tow barges, 4,368; unregistered craft, 1,222.

The business was divided between the United States and the Canadian canals as follows:

	U. S. Canal.	Canadian.	Total.
Vessel passages	17,588	5,071	22,659
Net tons freight	31,232,795	4,728,351	35,961,146
Passengers	22,778	36,599	59,377
Av. freight per vessel	1,776	844	1,587

The United States canal was opened April 5 and closed December 16, 1902; season, 256 days. The Canadian canal was opened April 1 and closed December 20, 1902; season, 264 days.

In addition to the above traffic through the canals, 6,500 cords pulp wood and 5,000,000 feet pine logs passed over the rapids, bound for lower lake ports.

The importance of the mineral traffic is shown in the following table, the figures, as in the tables above, being in net tons:

	Net tons.	Per cent of total.
Anthracite coal	309,948	0.8
Bituminous coal	4,502,530	12.5
Total coal	4,812,478	13.3
Iron ore	24,277,555	67.5
Pig and manufactured iron	198,152	0.6
Copper	120,612	0.4
Building stone	38,919	0.1
Salt	62,063	0.2

The mineral traffic, including salt, was thus 82.1 per cent of the total freight; while iron ore alone was 67.5 per cent. The ore which passes the Sault furnishes raw material for considerably more than half the iron made in the United States.

PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending December 30, 1902.

716,861. APPARATUS FOR MANUFACTURING ARTIFICIAL STONE.—Wilhelm Bügler, Stuttgart, Germany. The combination of traveling wagons, molds for placement therein, which receive the material to be treated, and a suitable roller under which said wagons carry the molds and material.

716,893. ANNEALING-FURNACE.—Alfred M. Hewlett, Kewanee, Ill. In an annealing-furnace, the combination of an annealing-chamber, a fire-box at one side thereof and a conduit for conducting the heat from said fire-box under and in proximity to the floor of said annealing-chamber and thence into contact with all sides of said chamber.

716,894. METHOD OF ANNEALING IRON OR STEEL CASTINGS. Alfred M. Hewlett, Kewanee, Ill. A process of annealing castings which consists in depositing a quantity of castings to be annealed in mass in an annealing-furnace the quantity of castings being sufficient to maintain a proper annealing temperature in the furnace after such temperature shall have been first attained until all, or substantially all, of the castings shall have been annealed, heating up the contents of the furnace to an annealing temperature, and permitting the mass of castings to stand without further firing or otherwise applying extraneous heat after they have been heated to an annealing temperature.

716,977. PROCESS OF PURIFYING ALUMINUM.—Edward L. Anderson, St. Louis, Mo., assignor to John A. Gilliam, trustee, St. Louis, Mo. A process of finishing aluminum, which consists in treating the surface thereof with hydrofluoric acid, and removing from said surface during said treatment the gas thereby generated.

716,985. METHOD OF MAKING SULPHURIC ANHYDRIDE.—Adolf Clemm, Mannheim, Germany. A process which consists in leading a mixture of sulphurous acid and air, all in a state as free from water as possible, over sulphate of copper which is heated to a red heat.

717,027. ROCK-DRILL.—John H. Redfield, Spokane, Wash., assignor of one-half to Charles Grutt, Emil Grutt, and Fred Grutt, Bossburg, Wash. The combination with a drill-shaft having a fixed collar, of a cam-shaft recessed intermediate of its length to permit the passage of said collar, and a cam mounted on said shaft and having an operating-face extending approximately from the axis of rotation of said shaft.

717,028. ATTACHMENT FOR ROCK-DRILLS.—John H. Redfield, Spokane, Wash., assignor of one-half to Charles Grutt, Emil Grutt and Fred Grutt, Spokane, Wash. An attachment for rock-drills, comprising an auxiliary crank-shaft, a bracket carrying the same, a tube to which said bracket is secured, a socket member carried by the tube and adapted for application to and pivotal movement on the main crank-shaft of the drill, and gearing connecting the shafts.

717,029. VALVE FOR AIR-COMPRESSORS.—Edwin Reynolds, Milwaukee, Wis. In combination with a cylinder-head having an opening formed therein; a valve-seat mounted in one end of the opening; a valve; a guide for said valve; and an independent shell intermediate the guide and valve-seat.

717,048. APPARATUS FOR RAISING LIQUIDS, SUCH AS OIL, FROM OIL-WELLS BY DIRECT AIR-PRESSURE.—Robert Stirling, Baku, Russia. The combination of a closed chamber located in the well and fitted with a non-return inlet-valve for the admission thereinto of the liquid to be raised, a pipe for discharging said liquid out of said chamber, an air-pipe connected to said chamber, a piston-valve having a smaller end piston normally exposed to the compressed air and an opposite larger end piston, a three-way valve opening communication between said larger piston and the atmosphere to permit said valve to be opened and a supply of compressed air to be conducted through said air-pipe to said chamber to expel and raise the liquid therefrom and alternately opening communication between said larger piston and the compressed-air supply to move said valve to cut off the supply of compressed air to said chamber, and an automatic device exterior to said chamber and operated by the discharge therefrom for alternately opening and closing said three-way valve.

717,052. CHARGING-CRANE.—Clarence L. Taylor, Alliance, Ohio, assignor to the Morgan Engineering Company, Alliance, Ohio. In a charging-crane, the combination with a depending frame, and an operator's cage and a carrying-frame having a removable end section, of tong-shafts and an actuating-motor carried by said carrying-frame.

717,053. CHARGING OR DISCHARGING CRANE.—Clarence L. Taylor, Alliance, Ohio, assignor to the Morgan Engineering Company, Alliance, Ohio. In a charging-crane the combination with a bridge and a trolley thereon, of a frame depending from the trolley and provided at a point below the bridge with parallel trackways on its front and rear faces, the trackway on the front face extending below the trackway on the rear face, of a truck having wheels engaging said trackways, a charging-bar carried by said truck and means on the charging-bar for grasping an ingot.

717,063. CONVEYER.—Charles J. Allen, San Francisco, Cal. A conveying apparatus, consisting in the combination of a single rigid inclined track, a burden-carrier adapted to travel thereover, a cable secured to each end of said track, guide-sheaves therefor, and connections between said cables whereby they are raised and lowered in unison.

717,069. APPARATUS FOR MAKING BLACK PLATES OR SHEETS.—Charles W. Bray, Pittsburg, Pa., assignor to the American Tin Plate Company, Orange, N. J. In apparatus for manufacturing black plates or sheets, a continuous mill comprising a series of sets of roughing-rolls arranged in tandem, mechanism at the end of the roughing-rolls arranged to move the bar at an angle to its path through the rolls, shear mechanism arranged to sever the bar transversely during its movement, and a conveyor leading from the shears to a finishing-mill.

717,093. OXIDIZING-FURNACE.—John E. Greenawalt, Denver, Colo., assignor of one-half to William Robinson, Denver, Colo. In a stack oxidizing furnace, the combination of two or more shaft-compartments, a dust-chamber compartment, means to elevate the hot and partially-roasted ore falling at the bottom of one of the shaft-compartments, to the top of another shaft-compartment, and means to collect the hot and partially-roasted dust falling in the dust-compartment and elevate it to the top of one of the shaft-compartments.

717,161. APPARATUS FOR HANDLING COAL OR OTHER MATERIAL.—Jeremiah Campbell, Newton, Mass. In an apparatus for handling coal and other material the combination of a barge, lighter or similar support, means mounted thereon and transported thereby for lifting coal or other material and transferring it crosswise the barge or lighter to an auxiliary cross-transferring device, said means comprising a tower, a horizontal boom carried by the tower, a trolley movable upon the boom and a grab or other conveyer movable toward and from the trolley, the said auxiliary cross-transferring device comprising a beam or girder carried by said barge or lighter to extend lengthwise it and crosswise and beneath the boom, a truck movable upon said beam or girder and a hopper or receptacle carried by said truck, adapted to receive the contents of the lifting grab or conveyer and to transfer them lengthwise said barge or lighter to a discharging position.

717,162. APPARATUS FOR HANDLING COAL OR OTHER MATERIAL.—Jeremiah Campbell, Newton, Mass.—In an apparatus for handling coal or other material, the combination of a boom, a trolley mounted thereon to traverse any portion of it at will, a grab or other conveyer vertically movable with respect to the trolley, a hopper truck or support movable upon said boom, and a hopper suspended from said truck or support.

717,177. REGENERATIVE FURNACE.—John A. Drake, Halifax, England. The combination, with a regenerative furnace-chamber provided with primary air-inlets and arranged one on each side of it and having also secondary air-inlets; of a main air-supply pipe arranged crosswise of the said furnace below all the said air-inlets, separate branch air-pipes provided with valves and connecting the said main air-pipe with all the said air-inlets, and means for forcing air into the middle part of the said main air-pipe between the said branch pipes which are connected to the said primary inlets.

717,183. COBALT-AMMONIUM SALT AND PROCESS OF MAKING SAME.—Hans A. Frasch, Hamilton, Canada. A cobalt-ammonium salt, consisting of a double salt of cobalt-ammonium chloride combined with four equivalents of ammonia. Also a process of separating cobalt from nickel and other metals whose hydroxides are soluble in ammonia, consisting in bringing the metals into solution, adding thereto ammonia in excess, precipitating the nickel and cobalt by the addition of a salt capable of displacing them, separating the precipitated nickel-cobalt-ammonium salts by the addition thereto of water, thereby bringing the nickel-ammonium salt into solution, and precipitating the cobalt.

717,195. AMALGAMATING APPARATUS.—John J. Hill, Denver, Colo.—The combination with a supporting-frame, of a basin for holding a body of quicksilver, a copper cylinder having ribs at intervals on its surface and supported in said frame to rotate in said basin with its surface always above the surface-line of the body of quicksilver below it, and a pulp-passage formed between said basin and cylinder and constricted toward its overflow side.

717,215. HOISTING APPARATUS.—Cass L. Kennicott, Chicago, Ill. In hoisting apparatus of the character described, the combination of a water-wheel having a shaft provided with a clutch member, a hoisting-drum having a clutch member for engaging said first-named clutch member, a fixed friction-disk adjacent to one end of the drum, and means for shifting the drum.

717,248. BOSH-PLATE FOR BLAST-FURNACES.—John C. McCausland, Pittsburg, Pa. A bosh-plate provided with a continuous horizontal chamber which extends from front to rear and from side to side thereof, a horizontal division-plate extending through said chamber from the rear nearly to the front and dividing the chamber into upper and lower compartments which communicate only at the inner end of the bosh-plate, and water connections located at the outer-edge of the bosh-plate and on opposite sides of the line of union between the division-plate and the outer end wall of the bosh-plate.

717,266. GAS-PRODUCER.—Royal C. Peabody, Brooklyn, N. Y. In a producer-gas apparatus, the combination of a producer-chamber, a hollow pier or pedestal within said chamber and communicating with the exterior of the chamber, said pier or pedestal having an opening leading from its interior to the interior of the chamber, and a series of stokers within the chamber near its lower end radiating from said pier or pedestal.

717,299. EXTRACTION OF ZINC AND LEAD FROM SULPHIDE ORES.—George C. Stone, Newark, N. J. A method of separating zinc and lead from sulphide ores, which consists in smelting the sulphides, oxidizing the volatile constituents at their exit from the smelting-furnace, cooling the resulting fumes and products of combustion to a temperature not exceeding 180° F., and passing them into contact with a solvent which will dissolve out one of the metals and not the other.

717,301. SLUICE OR RUNWAY.—George Telford, Oraville, Cal., assignor to Risdon Iron and Locomotive Works, San Francisco, Cal. A sluice or runway provided with deflecting-plates pivotally secured at their upper ends to the sides of the sluice or runway and being suspended longitudinally thereof, the free end of each deflecting plate being provided on its under surface with a series of transverse strips rigidly secured thereto, said strips being inclined or beveled in the direction of flow through the sluice or runway.

717,328. PROCESS OF REDUCING METAL AND MAKING METALLIC HYDROXIDES.—Henry S. Blackmore, Mount Vernon, N. Y. A process of reducing metals which consists in exposing a compound composed of a metallic oxide with a metal more electropositive than the metal of the oxide to the action of heat and a gaseous substitution agent capable of displacing the more electronegative metal.

717,332. ROTATING AND DISCHARGING RETORT-FURNACE.—Irving L. Briggs, Camden, N. J., assignor to N. Z. Graves & Co., Inc., Philadelphia, Pa. In a retort-furnace, a cylindrical retort having at either end a peripheral flange, two grooved rollers engaging the peripheral flange at one end of the retort, a fixed bearing in which the grooved rollers rotate, a second set of two grooved rollers engaging the peripheral flange at the other end of the retort, a yoke having its under face inclined upward from the center to the ends of the yoke, said yoke supporting the second set of rollers a predetermined and fixed distance apart, two sliding blocks arranged beneath the oppositely-inclined surfaces of the yoke, means for sliding said blocks toward or away from each other to thereby elevate or depress the yoke and second set of rollers, and means for rotating said retort upon the fixed and adjustable rollers.

717,440. UNLOADING MECHANISM FOR COKE-OVENS.—George H. McCracken, Cumberland, Md. The combination of an oven having a bottom adapted to be rotated, a conveyer adapted to operate over the bottom for extracting the contents of the oven, means whereby the bottom is rotated so as to feed the contents to the conveyer for removal, and means for operating the conveyer simultaneously with the rotation of the bottom.

717,441. EXPLOSIVE.—Lewis McDaniel, Tabor, Iowa. The process of making a smokeless power consisting of dissolving sugar in water to form a syrup, incorporating chlorate of potash and saltpeter, stirring and mixing the same until a granulated powder is produced, and subjecting the power to agitation in the presence of gasolene.

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717,565. PROCESS OF EXTRACTING COPPER FROM ITS ORES.—Adolf von Gernet, London, England. A process of extracting copper from its ore, which consists in slowly passing the ore in the form of pulp through a current of sulphurous acid passed in a direction opposite to that of the travel of the pulp.

717,575. APPARATUS FOR CHARGING INCLINED RETORTS.—Walter R. Herring, Edinburgh, Scotland. The combination, with a chute having guide-rails at its lower part, of a hood slidable on the said rails longitudinally of the retorts, an inclined shoe, links pivoting the lower part of the said shoe to the said hood, and means for adjusting the position of the upper end portion of the shoe within the said hood.

717,580. ROTARY MIXER FOR CONCRETE.—William J. Judd, New York, N. Y., assignor to Frederick C. Austin, Chicago, Ill. A machine comprising a drum open at opposite ends and arranged to revolve about a horizontal axis; a mixer and conveyer consisting of a rotary shaft extending longitudinally through the rotary drum and provided with laterally-projecting blades having faces in planes oblique to the axis of rotation of the shaft to drive the mixer and conveyer at a rate of speed greater than that at which the drum is driven.

717,585. MACHINERY FOR PICKLING PLATES FOR COATING WITH TIN, ETC.—John E. Lewis, Avenue, Pa., assignor of three-fifths to Allegheny Steel and Iron Company, Pittsburg, Pa. In a pickling mechanism, a beam, means for oscillating the beam, means for raising the beam, and means movable relatively to the raising means for locking the beam from oscillation.

717,589. EXCAVATING-MACHINE.—Ezra A. Mathers, Washington, D. C. The combination, of the frame, the digger comprising a head with digging devices and rearwardly-projecting arms mounted on said frame, said arms being mounted to slide in suitable supports on said frame, means for carrying said digger upward and forward and then lowering it into the earth, and then drawing it back toward the machine away from the point of loading with the load and then freeing it from said load by raising it and again carrying it forward, and the driving mechanism.

717,607. ELECTRODE FOR STORAGE BATTERIES.—Leonard Paget, New York, N. Y., assignor to Charles Coster, New York, N. Y. A plate adapted to form a storage-battery electrode and consisting of a thin corrugated plate of compressed arborescent crystals of lead.

717,609. STORAGE-BATTERY ELECTRODE.—Leonard Paget, New York, N. Y., assignor to Charles Coster, New York, N. Y. A storage-battery element consisting of a conducting-support and finely-divided lead on said support compressed to a density approximately that of sheet-lead.

717,610. STORAGE BATTERY AND METHOD OF PREPARING ELECTRODES THEREFOR.—Leonard Paget, New York, N. Y., assignor by mesne assignments to chas. Coster, New York, N. Y. A storage-battery element in which the active material or material adapted to become active consists of finely-divided lead compressed to a density approximately that of sheet-lead.

717,635. WOOD PIPE.—Isaac D. Smead, Cincinnati, Ohio. A wood pipe having a central hollow core, combined with a series of outer staves, a series of air chambers or space being formed intermediate said staves and the core.

717,640. DEVICE FOR REGULATING AND CONTROLLING THE SUPPLY OF GAS AND AIR TO FURNACES.—Desiderius Turk, Riesa, Germany. A device comprising a rotable dome, a plurality of furnace-openings arranged beneath the dome, vertical partitions dividing the interior of the dome into a plurality of compartments, a fuel-supply, a communication through one of the compartments between one of the furnace-openings and the fuel-supply, and a communication through the other compartment between one of the furnace-openings and the flue, whereby as the dome is rotated the furnace-openings are alternately and successively connected with the fuel-supply and the flue.

717,654. GAS-ANALYSIS APPARATUS.—Max Arndt, Aix-la-Chapelle, Germany. The combination of a receptacle, partly filled with liquid, to receive the gaseous mixture; a sampling vessel contained in said receptacle, having an aperture at the bottom and a tube descending from the top and terminating above the level of said aperture; and a vessel filled with a gas-absorbing liquid, communicating with said sampling vessel; and means for indicating the change in volume through absorption.

717,673. ROLLING-MILL.—Jerome R. George, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass.—The combination with a pair of rolls, having two or more grooves or passes for the consecutive reduction of a rod or bar, of means for conducting or transferring the advancing end of the rod or bar from one of said grooves around one of the roll-housings to a succeeding groove in said rolls.

717,702. STONE-BORING MACHINE.—John P. Murphy, Portland, Me. In a stone-boring machine, the combination of a frame, a shaft mounted revolubly and vertically movable in the frame, and a cutter-head carried by the lower end of the shaft and comprising a circular disk having a hub, a series of radiating arms provided each with a slot.

717,707. BRICK-MACHINE.—Henry McIntosh, Sarnia, Canada, assignor of two-thirds to R. E. Moss, Port Huron, Mich. The combination with a horizontally-reciprocating mold, of a vertically-reciprocating plunger adapted to coact with said mold, means for reciprocating said mold in a horizontal plane, and means for reciprocating it in a vertical plane.

717,750. AIR OR LIQUID RECIPROCATING PUMP HAVING ROTARY OPERATING MECHANISM.—George W. Johnston, St. Joseph, Mo. In a reciprocating power-pump having a rotary operating mechanism the combination with a supporting-frame and the necessary driving power, of duplicate cam-plates and their connecting-rim whose periphery is the driving-pulley, a single stationary cylinder between said cam-plates provided with duplicate slots set longitudinally in the cylinder opposite each other at each end.

717,754. HYDROCARBON-BURNER AND ATTACHMENT.—William J. Lane and George Lane, Poughkeepsie, N. Y. A hydrocarbon-burner comprising a casing, a mixing-chamber, a portion of which is within the casing and a portion of which is external to the casing, a supply-tube for the mixed gas and air extending through the portion within the casing and into the portion external to the casing, and a series of transverse burner-tubes communicating with that portion of the mixing-chamber within the casing.

717,805. CONCENTRATOR.—James S. Brownell, San Francisco, Cal. In a vanner or concentrator, including an endless traveling belt and a worm-gear the members of which are movable one relative to the other and through which motion is transmitted, an eccentric from the strap of which the worm is suspended, and by the turning of which the worm and gear may be engaged or disengaged, and a swiveled journal-box suspended from said strap and in which the shaft of the worm is mounted.

717,835. EXCAVATOR.—William H. Fulcher, Oakland, Cal., assignor of one-half to Herman Murphy, San Francisco, Cal. An excavating-machine, consisting of a portable framework upon which the mechanism is carried, means for advancing it in the line of the proposed excavation, a transverse extension from one side of the frame, an endless chain with excavating mechanism carried thereby, guides for said excavating mechanism having one end movably supported from the outer end of the transverse extension, and mechanism by which the inner end of said guides and the chain-sprockets may be raised or depressed.

717,840. PROCESS OF JOINING METAL PIECES.—Hans Goldschmidt, Essen-on-the-Ruhr, Germany, assignor to Clarence B. Schultz, Berlin, Germany. Process of joining metals by means of the heat arising by the reaction taking place when pulverized aluminum and oxygen containing metal compounds are mixed and this mixture is ignited, said process consisting in casting the highly-overheated molten metal arising by the reaction directly around one part of the metal pieces to be joined, and the molten alumina around another part of these metal pieces.

717,852. MINING-PUMP.—John K. Hogan, Placerville, Cal. A deep-level pumping apparatus comprising parallel open-bottomed cylinders with inlet-openings, plungers, valves and discharge-pipe; a second series of similar pumps located at intermediate levels between the bottom and the top; tanks from which the pumps are supplied and into which the water from the levels below is successively delivered; pump-rods extending to the bottom said rods having connection at the lower ends with plungers of the lowest pump, and having rack-bars at their upper ends; mechanism including a horizontal shaft and toothed segments thereon engaging said rack-bars whereby the rods are alternately reciprocated so that one pump is always lifting before the other commences to descend; and connections between the rods and the plungers of each of the intermediate pumps whereby all are operated in unison.

717,864. METHOD OF TREATING ORES.—John T. Jones, Iron Mountain, Mich. The process of mixing with ore, to be treated, a leaching fluid, which consists in confining the mass of ore in a vessel with a body of leaching fluid of lesser specific gravity superimposed upon it, carrying portions of the ore upward in said vessel and releasing it above the body of leaching fluid to precipitate it through said body, and simultaneously convey portions of the leaching fluid below the surface of the mass of ore and releasing it and permitting it to rise through the same.

717,886. METHOD OF MAKING SEAMLESS TUBES OR HOLLOW ARTICLES.—Camille Mercader and Clarence P. Byrnes, Pittsburg, Pa. A method of making pierced billets and similar articles, consisting in clamping a small end portion of the blank by forcing short side clamping-dies against said portion and then successively and continuously piercing the short clamped portion, and piercing and expanding the unclamped portion substantially throughout its length.

717,911. STONE-CUTTING MACHINE.—Claud L. Payne, Oolitic, Ind. In a machine for sawing stone, and in combination with a band-wheel forming a support for the saw, and a driver adapted to actuate the said band-wheel, feed-screws for advancing and withdrawing the band-wheel, a shaft movable longitudinally, gearing between said shaft and the feed-screws for rotating the latter in opposite directions either to advance or withdraw the band-wheel.

717,975. CHAIN-LINK.—James M. Dodge, Philadelphia, Pa. assignor to the Link Belt Engineering Company, Philadelphia, Pa. The combination in a chain-link having two side members, a cross member, said cross member having a reduced portion forming shoulders at each end, the reduced portions having screw-threads cut in the same direction and the side members having threaded openings into which the threaded portion of the cross member is screwed.

718,022. BRICK-KILN.—Chauncey B. Platt, Vanmeter, Iowa. A brick-kiln having an interior compartment, furnaces arranged in the wall of the kiln and having flues opening adjacent to the top of the kiln, a central flue extending around the middle portion of the base of the kiln and having a partition arranged therein, radial flues opening into the opposite sides of the central flue, a flue disposed within the space inclosed by the inner wall of the central flue, floor-flues parallel with each other and bridging the central and radial flues, an open-work floor on the parallel floor-flues, and a main draft-flue opening from the flue inclosed by the central flue.

718,027. COKE-OVEN.—Mathew E. Rothberg, Lebanon, Pa. In adjacent coke-ovens, a hollow bottom, partitions in the cavity of said bottom and forming transverse reverting combustion-flues, a hollow wall separating the oven-chambers, a transverse partition dividing the cavity of said wall into two compartments, partitions forming longitudinal reverting combustion-flues in said compartments, a reverting hot-air flue leading to said transverse flues, a draft-flue above the ovens, a hot-air chamber surrounding the draft-flue, and supplying hot air to said hot-air flue, said longitudinal combustion-flues communicating below with said transverse flues, and above with the draft-flue.

718,039. AUTOMATIC OILER FOR MINING-CARS.—Reuben S. Walker, Pinehill, Pa. A wheel having an oil-chamber extending around but not communicating with its bore, a waste-chamber, an oil-passage between the latter and the bore, an oil-passage between the oil-chamber and the waste-chamber, coincident openings in one side of the oil-chamber and in the partition between the latter and the waste-chamber, and a closure for the said openings.

718,043. BRIQUETTE-MAKING MACHINE.—Ellsworth B. A. Zwoyer, Hoboken, N. J. The combination of rolls tangent to each other, disks secured together forming the rolls, a circumferential ridge on each disk, ridges at right angles to the circumferential ridges and in the circumferential surfaces of the disks, cavities on the sides of the circumferential ridges and between the ridges.

718,045. ELECTRICAL STORAGE BATTERY.—Henry K. P. Barham, Portsmouth, England. A series of strips of metal each folded upon itself with saturated absorbent material between the folds thereof, and forming a tray intermediate the ends thereof.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending December 11, 1902.

25,489 of 1901. ORE BREAKER.—H. G. Scott, Kettering. Improvements on mounting the jaws of ore breakers to relieve the strains.

25,605 of 1901. GYRATORY CRUSHER.—R. A. Hadfield and A. G. M. Jack, Sheffield. Improved method of giving gyratory motion to the gyrating head of crushing mills.

586 of 1902. QUENCHING COKE.—Paris Gas Lighting and Heating Company, Paris, France. Quenching coke with a limited immersion in water so that the coke shall not be wet when cold.

788 of 1902. SULPHURIC ACID CONCENTRATION.—S. Dreyfus, Manchester. In the concentration of sulphuric acid, leading the distilling vapors into contact with the entering acid in a special tower.

4,646 of 1902. UTILIZING GAS REFUSE.—C. F. Maybluh, Paris, France. Boiling sulphides of iron made in gas purifiers with mineral oils having boiling point above 150° C., so dissolving the sulphur, on cooling the sulphur deposits; the object being to eliminate the tarry matters adhering to the sulphide.

6,728 of 1902. STEEL MAKING.—L. V. Pratis, Turin, Italy. Using with pig iron in making steel, a magnetic oxide formed by dissolving granular iron in sulphuric acid and igniting the sulphate formed.

16,331 of 1902. ROCK-DRILL.—C. W. Thompson, London. An improved rock drill actuated by blows of water on the piston.

17,380 of 1902. MAGNETIC SEPARATOR.—C. Leuschner, Friedrichssegen, Germany. A magnetic separator with a magnetic plate under the thin surface of non-magnetic material over which the wet crushed ore passes.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

PERSONAL.

Mr. R. T. Bayliss is visiting the El Oro Mine in Mexico.

Mr. Edwin G. Hoyt is in New York City from Redding, Cal.

Mr. Herbert K. Scott has sailed from London, Eng., for Rio de Janeiro.

Mr. Alfred C. Lane, State geologist of Michigan, was in New York City last week.

Mr. Bulkley Wells has become general manager of the Smuggler-Union mines at Telluride, Colo.

Mr. F. Danvers Power has been appointed Lecturer in Mining at the University of Sydney, N. S. W.

Prof. F. A. Jones, of Albuquerque, N. M., has been appointed to take the mining census of New Mexico.

Mr. C. A. Butters has been examining mining properties at Candelaria, Esmeralda County, Nevada.

Mr. Frank Jardine has accepted the superintendency of the Martha Washington Company's mines at Tintic, Utah.

Dr. F. M. Simonds, of New York City, has just returned from an important mine examination in Ohio.

Mr. F. L. Slocum, general manager of the Miami Mining Company, was in New York City during the week.

Mr. H. V. Winchell, geologist to the Anaconda Mining Company, at Butte, Mont., has been in New York City.

Mr. John K. Mackenzie, of Dickman, Mackenzie & Potter, mining engineers of Chicago, is at Gilt Edge, Mont.

Mr. Walter E. Koch, manager of the Lustre Mining Company, of Durango, Mexico, is on a visit to New York City.

Mr. A. W. Warwick, mining engineer, has been appointed consulting engineer of the Bassick Mine, Custer County, Colo.

Col. Thomas Ewing, who had been in New York, Washington and other Eastern cities, recently returned to Los Angeles, Cal.

Mr. R. Whinnerah has resigned as superintendent of the Humphrey Tunnel and Milling Company's mill at Creede, Colo.

Mr. E. L. Newhouse, of the New York office of the American Smelting and Refining Company, was a recent Montana visitor.

Mr. Fred H. Minard, of Denver, Colo., has been in New York City, after a professional trip through Nevada, California and Utah.

Mr. G. V. Hopkins has resigned as manager of the Bullion Extraction Works at Silica, B. C., and is succeeded by Mr. C. M. Eye.

Mr. J. Keegan has resigned as superintendent of the Mountain Consolidated Mine of the Anaconda Mining Company, at Anaconda, Mont.

Mr. H. A. Geisendorfer recently returned to California from Sumatra, and has gone to the Golden Eagle Mine at Hayden Hill, Cal., as foreman.

Mr. Wright H. Aubury has returned to Los Angeles, Cal., having resigned his position with the Nevada Keystone Mining Company, Sandy District, Nev.

Mr. Horace Reno, of Arvada, Colo., a recent graduate of the Colorado School of Mines, is now surveyor for the Detroit Copper Company, at Morenci, Ariz.

Mr. J. H. Le Fevre, superintendent, and Mr. C. J. Barr, engineer of the Dominion Steel and Iron Company, Sydney, Cape Breton, were recently in Pittsburg, Pa.

Mr. W. L. Austin has left New York City on a visit to Butte, Mont., where he expects to study the metallurgical developments at the big copper smelters of that district.

Hon. Binger Hermann, commissioner of the General Land Office, at Washington, has resigned. He will be succeeded by Mr. William A. Richards, now assistant commissioner.

Mr. James Colquhoun, president of the Arizona Copper Company, who has been confined to his residence at Clifton, Ariz., for some weeks with typhoid fever, is reported convalescing.

Mr. Henry W. Edwards, late assistant manager of Mountain Copper Company's smelter at Keswick, Cal., has been appointed general manager for the Grand Junction Smelting Company.

Mr. R. N. Dickman, of Dickman, Mackenzie & Potter, of Chicago, Ill., has returned to Chicago from Europe, where he has been for 9 months examining mining properties of an American company.

Mr. Edward Cake, of Pottsville, has been appointed master mechanic of the machinery of the Philadelphia & Reading Coal and Iron Company's 35 collieries in the Pennsylvania anthracite region—a new position.

Mr. George W. Schneider, city and county surveyor at Central City, Colo., has been offered and has accepted the position of deputy State mining inspector of Colorado. Mr. Schneider is a graduate of the Colorado School of Mines at Golden.

Mr. H. B. Sturtevant, formerly superintendent of the Ashland Mine on the Gogebic Range, later of the Pioneer Mine at Ely, Minn., and the last year engaged in precious metal mining in the West, will have charge of the development of Rogers, Brown & Co.'s properties on the Mesabi Range.

Mr. Ernest R. Woakes has given up his position as engineer to the Duncan United Mines, Limited, of Nelson, B. C. He passed through New York City this week on his way to London, where he will be located for the present. His address will be care of George H. White, Esq., 804 Salisbury House, E. C.

Mr. L. W. Fogg, formerly of Somerset, Pa., but for a number of years past division superintendent of the Frick Coke Company, has accepted the position of general manager of the Brier Hill Coal and Coke Company, with headquarters at Uniontown, Pa. This is the fuel department of the Brier Hill Furnace Company, of Youngstown, O.

Mr. W. C. Herron, of Cincinnati, O., who has been a member of the firm of Rogers, Brown & Co., has disposed of his holdings to his former partners. Mr. Herron has been in poor health for some time, and on the advice of his physician has abandoned active business to take a trip through Egypt, the Holy Land and the major portion of Europe.

Prof. J. Dunraven Young, of Chicago, Ill., has completed arrangements for examining 4 developed mining properties in various parts of Mexico. Dr. Floyd Davis is now en route to Mexico, to represent Prof. Young at two of these properties, and Mr. Laurence W. Tatum, the Chicago mining engineer, will probably make reports on the others. Prof. Young expects to follow at a later date.

Messrs. J. W. Duntley, J. R. McGinley, Joseph Boyer, W. O. Duntley and J. B. Milliken, a committee representing the directors of the Chicago Pneumatic Tool Company, have returned to Chicago, Ill., after a visit of inspection to the various plants of the company, including the air compressor plant of the company at Franklin, Pa., and the plants at Cleveland, O.; Detroit, Mich., and Aurora, Ill.

Mr. Axel Sahlin, of the recently formed consulting engineering firm of Julian Kennedy, Sahlin & Co., London, which concern has contracts for remodeling British blast furnace and steel plants, is now on a visit to the United States. Mr. Julian Kennedy, the Pittsburg metallurgical expert, is the other member of the firm. Mr. Sahlin was formerly foreign representative of the Brown Hoisting Machinery Company, of Cleveland, O.

Mr. E. B. Thomas has resigned as chairman of the board of directors of the Erie Railroad, finding that his duties as president of the Lehigh Valley Railroad require all his attention. Mr. Norman B. Ream was elected a member of the executive committee in place of Mr. Thomas. The resignation of Mr. J. A. Middleton, second vice-president and secretary was also accepted. The resignation of Mr. L. D. Smith, assistant secretary, was tendered and accepted. Mr. G. A. Richardson was elected assistant to the president, and Secretary David Boaman was elected assistant secretary.

OBITUARY.

Moses Liverman, a pioneer of the San Juan Country, Colorado, died at St. Joseph's Hospital, Denver, recently, after a short illness of typhoid. Mr. Liverman was born in St. Louis in 1849, and came to the State of Colorado in 1880, residing the greater portion of the time at Silverton, where he was associated with Otto Mears in the Mears Transportation Company, and identified with several mining enterprises. He had been a resident of Denver for several years.

James Hutchinson, formerly manager of the Trade Doller Mine at Silver City, Idaho, and father of Joseph H. Hutchinson, died December 31 at the age of 65 years. He was superintendent of the Gregory Mine in Gilpin County, Colo., for 20 years. He was appointed State mine inspector of Colorado in 1889, and in 1893 took charge of the Trade Dollar Mine, which position he held until a short time ago, when he resigned on account of ill health.

SOCIETIES AND TECHNICAL SCHOOLS.

COLUMBIA UNIVERSITY.—Joseph John Thomson, 1889, for the last 18 years Cavendish Professor of Experimental Physics at Cambridge University, Eng., has been appointed by the trustees of Columbia University to become head of the department of physics, to succeed the late Ogden Nicholas Rood. Prof. Thomson was born at Manchester in 1856, and attended Owens College and Trinity College, Cambridge. He was Fellow of Trinity College in 1881, lecturer in 1883, and president of the Cambridge Philosophical Society in 1894. In 1896 he was elected president of Section A of the British Association, and is a member of the Athenæum and Saville clubs.

The trustees voted to designate the physical laboratories for research work by the name of the Phoenix Physical Laboratories in memory of Stephen Whitney Phoenix of the class of '59, who left a large sum to the university several years ago for physical research.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on January 3, there were 72 members and visitors present.

Mr. Charles Piez presented the paper of the evening upon "The Handling and Storing of Iron Ore." After quoting figures to show the increase in production and the decrease in cost of iron and steel since 1870, he described the methods of transporting the ore by steamer, especially on our great lakes, and the principal types of machinery for unloading these vessels and depositing the ore in cars or storage-bins, etc. The paper was illustrated by photographs of the different types of unloaders, conveyors, buckets, etc, It was afterwards discussed by Messrs. James Christie, Edwin F. Smith, J. Chester Wilson, A. C. Johnson and others.

Mr. Richard G. Develin exhibited and described for Mr. Joseph T. Richards a couple of lantern slides, showing the changes which have been made in the bridges, tracks and stations on the line of the Pennsylvania Railroad, between the east side of the Schuylkill River and Fifty-second Street, West Philadelphia.

MICHIGAN ENGINEERING SOCIETY.—The annual convention will be held at Battle Creek on January 20, 21 and 22. The following papers have been promised: President's address, Prof. M. E. Cooley; "Naval Architecture and Marine Engineering at the University of Michigan," Prof. H. C. Sadler; "The Engineer and the Patent Office," George B. Wilcox; "Some Cases of Lost Corners," B. F. Dorr; "Apportionment of Cost in the Subdivision of Sections by the County Surveyor," D. A. Brotherton; "Description of the Plant Used in Deepening the Channels of the Great Lakes and Connecting Waters," Harry Hodgman; "Value of Momentum Grades," J. J. Hubbell; "Method for Finding the Latitude, Local Time and Meridian of a Place," Norman B. Kellogg; "Automatic Register for Indicating the Stage of Water," Charles Y. Dixon; "More About the St. Clair Flats Survey," Prof. J. B. Davis; "Water Works Experiences," A. L. Holmes; "Forestry," F. E. Skeels; "Some Debatable Points in Masonry," E. W. Muenscher; "Best Form of Rail for Street Railways," E. W. Muenscher; "Notes of Litigation on the Title of a Mexican Grant in California," C. A. Ensign; "Some Questions in Land Surveying," F. Hodgman; "Sewage Disposal," W. S. Shields; "Results of Some Power Tests of Steam and Electric Railroad," Prof. John R. Allen; "Results of Some Tests of Steam Radiators," J. C. Thorpe; "Concrete Steel Sewer Construction," Geo. S. Pierson.

Reports from some or all of the following standing committees are expected:

1. On the Relation of Sewerage and Water Supply to the Public Health; H. E. Riggs, Toledo, O.; F. F. Rogers, Port Huron; George S. Pierson, Kalamazoo.

2. On Forestry: F. E. Skeels, Harrietta; J. J. Hubbell, Manistee; A. J. Teed, Cadillac; A. C. Lane, Lansing.

3. On Engineering Features of Municipal Work to be Protected by Ordinance: W. J. Sherman, Toledo; E. W. Muenscher, Manistee; J. J. Granville, Saginaw.

4. On Roads and Paving: F. F. Rogers, Port Huron; Dorr Skeels, Grand Rapids; E. W. Muenscher, Manistee.

5. On Questions in Land Surveying: F. Hodgman, Climax; Dorr Skeels, Grand Rapids; D. J. Albertson and E. Strong, Kalamazoo.

PUBLISHERS' ANNOUNCEMENT.

The issue of the *Pacific Coast Miner* for January 3 makes a very creditable showing. The succeeding week's issue will include a practical paper by Louis Janin, Jr., on the general subject of assay laboratories and facilities for testing ores. There is also an illustrated article on the rope tramways used in mining; the Almaden quicksilver mines are described in another well-illustrated contribution. Observations on the chemical problems arising in the petroleum industry, and an extensive array of news concerning min-

ing progress in the Western States, altogether make up an extremely attractive issue.

The concentration of effort and the enlarged editorial staff are indicated in the improvements already made in the *Pacific Coast Miner*. Among the subjects discussed editorially are mining in Alaska, the investment of Eastern capital, the new era in quartz mining, the development of dredging and allied subjects of timely interest.

The *Pacific Coast Miner* of January 17 contains an able and practical article by Louis Janin, Jr., on the "Ore Formation Occurring at the Easy Bird Mine, California," where concentrations of value have been effected by leaching from igneous rocks. The same well-known author contributes an article on the "Departure from Standard Cyanide Practice in the Employment of Small-Compartment Zinc Boxes." Other articles of importance cover the "Revival of Gold Mining in Kern County, California," and of "Quicksilver Mining in San Luis Obispo County." There is also an account of operations in the "Boundary District of British Columbia," the "Borax Industry in California," and "Recent Progress in Electrometallurgy." In addition to these various articles, there is an interesting and timely miscellany of mining news. The editorials in this issue are fully up to the high standard already established, and they deal with such important subjects as the National Bureau of Mines, Fraudulent Mining Schemes, the Proposal to Appoint Inspectors of Mines in California, and Mining as a Regular Business.

INDUSTRIAL NOTES.

The repairs to the American Copper Company's plant partially destroyed by fire at Garwood, N. J., are completed.

George E. Woodbury, of San Francisco, has contracted to build 8 Woodbury concentrators to be placed in the old Gover Mine, near Amador City, Amador County, Cal.

The American Smelting and Refining Company is in the market for a supply of 17,000 ft. of 10-in. wrought iron pipe, to be used for compressed air at the company's various Mexican plants.

The Tracy Engineering Works, of San Francisco, has secured the contract for an oil-burning equipment for the power plant of the Tombstone Consolidated Mining Company, Limited, at Tombstone, Ariz.

The Hungarian Asphalt Paving Company, Limited, of Budapest, Hungary, has just placed an order with the F. D. Cummer & Son Company, of Cleveland, O., for a complete Cummer semi-portable asphalt paving plant. The plant is to be erected at Budapest.

The Harrisburg Foundry and Machine Company, of Harrisburg, Pa., has duplicated for the Compania Fundigura, of Monterey, Mex., an engine which the Harrisburg works turned out a year ago. The engine is of 300 h.p., for electric work, and has been shipped to Monterey.

Messrs. Adam Cook's Sons, of 313 West Street, New York City, report the receipt of numerous letters from manufacturing concerns testifying to the merits of Albany grease, of which they are sole makers. Recent testimonials include letters from users of high-speed engines for electrical work.

The Burt Manufacturing Company, of Akron, O., reports that the Pittsburg Reduction Company has just placed an order for a 90-gal. oil filter, also an 18-in. exhaust head, to be used in the new works at East St. Louis, Ill. The Colonial Steel Company, of Pittsburg, Pa., has ordered a large oil filter from the Burt Manufacturing Company for use in its new steel works.

The Columbia Graphite Company has purchased a valuable graphite property in the Ticonderoga District, and is sinking a 500-ft. shaft. A company has been organized with $50,000 capital, and active steps are being taken toward the erection of a manufacturing plant at the mines. The company is in the market for a full equipment, including machinery of every description needed. B. E. Tinstman, 311 Tradesmen's Building, Pittsburg, Pa., is president of the company.

Among recent orders for cranes reported secured by the Northern Engineering Works, of Detroit, Mich., are the following: Three 70-ft. span electric traveling cranes for Oil Well Supply Company; 1 55-ft. span for Saginaw Plate Glass Company; 3 40 to 50-ft. span electric traveling cranes for Great Lakes Engineering Works; 1 10-ton 40-ft. span for Detroit Foundry Company; besides a number of smaller electric and hand power traveling and jib cranes. The company also reports the recent sale of 3 electric cranes for export to England and 1 for India.

The H. W. Johns-Manville Company states that a ring of wire insertion asbestos high-pressure packing that was in constant use for 6 years will be shown at the company's office, 100 William Street, New York City, to any one interested. During its long service the packing which was recently removed from the steam end of a Worthington duplex compound pump used in the elevator service of the Woodbridge Building, New York, never caused the engineer the slightest trouble. When removed it was still in excellent condition, and the rod is still perfectly smooth. The packing worked under 125-lb. pressure, the pump having a capacity of 3,000,000 gal. every 24 hours.

At a recent meeting of the stockholders of the U. S. Oil and Gas Well Supply Company, of Pittsburg, Pa., it was voted to increase the paid in capital $200,000, making the stock par value $100 per share. The company commenced business a little over a year and a half ago, and has been branching out in all sections of the oil fields ever since. With the opening of spring weather orders approximating $100,000 worth of supplies will be shipped to Cape Nome and Dawson City, Alaska. The officers are: President, T. L. Riddle, Marietta, O.; vice-president and treasurer, Emery Myers, Pittsburg, Pa.; secretary, George I. Bumbaugh, West Union, W. Va.; general manager and assistant treasurer, W. B. Monks.

The Phillips Mine and Supply Company, of Pittsburg, Pa., has completed the large addition to its plant on the South Side. The building is of brick and steel construction, 100 by 120 ft., 2 stories and a basement, connected with a 1-story building to be used as a blacksmith shop and bending department. By this addition the company will double its present output of mine cars, car wheels and mining machinery, providing an output of over 100 cars a day. The company operates its own foundry and manufactures all the different parts going into its products. In its present plant a test was recently made to determine its maximum output of cars, and in one day 100 cars were built.

The Christensen Engineering Company, of Milwaukee, Wis., has opened an office in the Merchants Loan and Trust Building, Chicago, Ill., for the sale of "Ceco" electrical machinery. The company has secured the services of Charles G. Burton as manager of the Chicago agency. Mr. Burton is favorably known in the electrical field through his previous connection for several years with the Central Electric Company, and later for 3 years with the Westinghouse Electric and Manufacturing Company. He left the latter company in the early part of 1902 to install a power and transmission system, resigning recently to accept his present position with the Christensen Company.

At the annual meeting of the Mine Securities Corporation in New York City the following were re-elected officers: President, Thomas Jefferson Hurley; vice-president, William H. Burger; treasurer, George J. Schermerhorn; assistant treasurer and secretary, W. Harold Cockcroft. Of the company's $2,500,000 authorized capital, it was stated but $1,500,000 has been issued. It now owns the controlling interest or 51 per cent in 52 mines, represented by those companies' securities, which it has purchased, aggregating $2,225,000, and has taken charge of the operation of the properties. Jay Hurley has been appointed the company's manager in Colorado, with headquarters at Silverton, and J. A. Cronkhite its representative in Mexico, with headquarters at Chihuahua.

M. H. Treadwell & Co., with offices at 95 and 97 Liberty Street, New York City, are finishing the installation of the industrial railway at the Spauldings & Jennings Works of the Crucible Steel Company of America, Jersey City. This installation is one of the largest of its kind in the neighborhood of New York. Over a mile of 21-in. track has been installed under roof. The equipment consists of 24 all steel cars, 6 all steel cars with wooden decks, and 2 steel cars of special construction and known as transfer turn tables. M. H. Treadwell & Co. have also completed the installation of an industrial railway at the National Lead Works, Brooklyn, N. Y. They have orders for 10 slag cars for the American Smelting and Refining Company, 6 being for the Monterey plant, Monterey, Mex., and 4 for the Auguascalientes plant in Mexico. These cars will be equipped with electric apparatus for propelling. Treadwell & Co. have also orders from the Dominion Iron and Steel Company for the Sydney Furnaces, Cape Breton, N. S., for a lot of 20-ton Treadwell hot metal cars of improved design. They also report a large business in the Crane department, of which Mr. R. M. Dorsey, the general manager, is now in charge, and Mr. John R. Morgan is chief engineer.

TRADE CATALOGUES.

Catalogue No. 5, issued by the Allis-Chalmers Company, of Chicago, Ill., appears in its tenth edition. It is entitled "Rock Crushing Plants." It describes briefly Gates rock and ore breakers, Gates iron frame revolving screens, Invincible rotary screens, Gates belt conveyors and geared elevators, automatic skips and dump cars, etc., and contains elevations of macadam ballast plants.

The Ottumwa Box Car Loader Company, of Ottumwa, Ia., is just putting out a very handsome catalogue with numerous cuts of the box car loaders the company manufactures as they appear at different mines and docks, where installed. These illustrations give one a very clear idea of the plan and working of the machine. All parties interested may obtain a copy of the catalogue on application to the company.

The Niagara hydraulic engine, described as a modern development of the old-style hydraulic ram, is made in various sizes for different purposes. The No. 1 machine, the smallest size, is for supplying dwellings or country houses with water, and has a 1-in. feed pipe, while the No. 12 size, which stands about 12 ft. high, and is most substantially made, is capable of pumping 150,000 gal. of water daily and upwards, according to the distance and elevation to which the stream must be delivered. It will supply water for the largest tanks along railroads, or enough for the boilers of a great plant, or the washers at a mine. The device is described in detail in a pamphlet issued by the Niagara Hydraulic Engine Company, of Chester, Pa.

The 1903 asbestos catalogue of the H. W. Johns-Manville Company, of 100 William Street, New York City, is a handsome booklet of 100 pages. The half-tone illustrations, numbering nearly 150, show asbestos in many conditions, from the natural state to forms into which it is manufactured. The latter include material for both heat insulation and refrigeration; packing for all conditions of service; asbestos paper and millboard for fire-proof construction, electrical insulation, heat and cold insulation; fire resisting cements and sundries such as fire-proof theater curtains, asbestos gloves and household articles. The list of over 300 buildings, manufacturers, etc., using the company's products, includes firms prominent in every line of industry. The arrangement of the catalogue is such that quick reference may be made to any article. Each section has its own table of contents, and there is also a complete alphabetical index. In addition to the attention given to the technical details, the care devoted to the typographical dress is evident throughout. The book is attractively printed in two colors, with a striking cover design in blue and white. A copy may be obtained by addressing the company's New York office, or any of the branch offices.

GENERAL MINING NEWS.

One of the most important deals in the history of the Atlantic seaboard bituminous trade was closed at Baltimore, Md., on January 6. Stockholders in the Consolidation Company, of Baltimore, acquired large holdings in the Somerset Coal Company, of Somerset, Pa., and in the Fairmont Coal Company, of Fairmont, W. Va. Stockholders in the Fairmont and Somerset companies took stock in the Consolidation Company. Virtually the deal gives the Baltimore & Ohio Railroad interests, which hold fully a half of the Consolidation Company stock, control of the Fairmont and Somerset companies. The deal also indicates that the ocean transportation fleet of the Consolidation Company will be strengthened, and shipping facilities to the lakes increased over the docks of the Northwestern Fuel Company, in which the Fairmont Company has a controlling interest. The Consolidation Coal Company has been reorganized, and these directors elected: George C. Jenkins, C. W. Watson, L. F. Loree, Edward R. Bacon, James M. Quigley, J. H. Wheelwright, O. G. Murray, Henry J. Bowdoin, George M. Schriver, and George A. von Lingen. Clarence W. Watson, who was manager of the Watson Coal Company's properties in the Fairment region and became president of the Fairmont Coal Company when it was formed in 1900, is the new president of the Consolidation Coal Company. He has been president of the Somerset Company since its formation in 1901. The Clarksburg Fuel Company, of Clarksburg, W. Va., formed in 1901, is a subsidiary corporation of the Fairmont Company. Charles K. Lord, who has been president of the Consolidation Company, is now chairman of the board; J. H. Wheelwright is assistant to the president; George De Bolt is treasurer; T. K. Stuart, assistant treasurer and secretary; L. G. McPherson, secretary, and W. G. Sharp, general manager of sales.

The capital stock of the Consolidation Company is $10,250,000, of the Fairmont Company and subsidiary corporations, $17,500,000, and of the Somerset Company, $4,000,000. The total output of the Consolidation Company in 1901 was 1,685,384 tons. The company owns the Cumberland & Pennsylvania Railroad, 55 miles long, and its total assets including vessels, are placed at $15,305,000. The company was incorporated in 1864. It owns property in the George's Creek region in Maryland, and in Somerset County, Pa. The Fairmont Company owns 30,280 acres of bituminous coal lands, and holds 24,986 acres under perpetual lease, a total of 55,166 acres. The property lies on both sides of the Monongahela River, adjacent to the lines of the Baltimore & Ohio Railroad, south of Clarksburg, W. Va. The company ac-

quired the mines of the Gaston Coal Company, Palatine Coal Company, Mason Coal and Coke Company, West Fairmont Coal and Coke Company, American Coal and Coke Company, Montana Coal and Coke Company, Highland Coal and Coke Company, Hutchinson-Ehlen Coal Company, Briar Hill Coal and Coke Company, and Meadow Brook Coal and Coke Company. The Somerset Coal Company acquired the following bituminous properties in Somerset County, Pa., on or near the lines of the Baltimore & Ohio Railroad—Cumberland and Elk Lick Coal Company, Duncombe Mine, Cumberland & Summit Coal Company, Althouse Mines, Enterprise Coal Company, Casselman Coal Company, Listie Mining and Manufacturing Company, Pine Hill Coal Company, Stuart Coal Company, Tub Mill Mine, Chapman Mine, Wilmoth Mine, Thomas Mine and Wilson Creek Coal Company.

The combined capital of the companies is $31,750,000, and their aggregate estimated capacity close to 8,000,000 tons annually.

ARIZONA.

COCHISE COUNTY.

Copper Belle Mining Company.—Judge Davis, at Nogales, has appointed A. H. Emmanuel receiver of this company, which owns copper claims at Gleason. An injunction also has been issued against John Gleason, who holds a mortgage for $53,000, and the sheriff of Cochise County, who holds the property under an enactment, restraining them from interfering with assessment work on the mining claims. Many of the stockholders live in New York City.

In an action begun in the Supreme Court in New York City against the directors of the Copper Belle Company, Elie J. Moneuse asked for an accounting, and charges gross fraud and the misappropriation of the funds of the company.

COCONINO COUNTY.

(From Our Special Correspondent.)

Azurite Copper Company.—This company, at Williams, is installing a George process plant for reducing the ores.

GRAHAM COUNTY.

(From Our Special Correspondent.)

Clifton Consolidated Sompany.—This company, near Clifton, is opening ground by 3 tunnels, the lower one now having reached a depth of 1,700 ft. under the mountain, and the 2 upper workings 1,000 ft. each. Electric drills are used, which General Manager Dunham says give entire satisfaction.

Lone Star.—A body of good copper ore is reported developed in a winze 400 ft. below the surface of this mine at Solomonville. C. B. Spaulding has been appointed superintendent.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Comstock.—S. C. Bagg, superintendent of this mine in New London District, is drifting on the hanging wall at the 185 ft., and is showing up some good silver-lead ore.

Cyclopics.—At this mine, in Gold Basin, A. B. Robbins, is superintendent. New crushing machinery is being added.

Hardscrabble.—This mine, at Union Pass, is under the management of W. A. Meusch, who has a number of men at work sinking on a 4-ft. vein of gold ore.

Lucky Boy.—This mine, on Corbat Mountain, has cut into a new vein of ore on the 500-ft. level.

Mohave Mining Company.—This company, at Gold Road, is using machine drills in the tunnel on the vein of the Leland-Mitchell Mine.

Silver Legion.—The tunnel on this mine, at Stockton Hill, has almost reached the vein.

Tennessee.—This mine, at Chloride, has purchased the water rights from the old Empire Mine, 1 mile above, and the 100-ton mill is running on full time. A full force of miners is at work.

YAVAPAI COUNTY.

United Verde.—According to a press dispatch the fire in this mine at Jerome has been extinguished. At the New York office of the company the latest reports from the mine are to the effect that the fire is probably out, but some days must elapse before the company can be sure, as the workings still are too full of gas to permit investigation. The company is preparing to resume work at the mine and smelter.

(From Our Special Correspondent.)

Cypress.—The hoisting plant and other machinery of this mine at Big Bug is being hauled to the run locations planned by G. W. Middleton, who has the property under a bond.

Oro Grande.—George B. Upton, general manager of this mine, near Wickenberg, is East to purchase a hoisting and diamond drill plant.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Hoffman.—The tunnel on this mine at Jackson is now in about 300 ft. The company is desirous of finding the most suitable point to sink a development shaft.

Kennedy Mining Company.—At this mine, near Jackson, J. F. Parks superintendent, the cement foundations for the new hoist are completed. Work is progressing on the new 40-stamp mill.

South Eureka.—At this mine, Sutter Creek, John Truscott superintendent, men are drifting north and south on the 2,300 level, but have not yet encountered the ledge in either drift.

BUTTE COUNTY.

(From Our Special Correspondent.)

Asbestos.—John M. Ward has started a prospect shaft on a ledge of asbestos, near Garden Ranch.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Beatrice.—The new machinery at this mine at Murphys has been installed.

Douglas Placers.—Work at these claims at Murphys is progressing under supervision of J. M. Evans.

Echo.—W. B. Lake, superintendent of this mine at Murphys, is having a ditch dug higher up the hill to increase the water pressure.

Foote & Thompson.—At this property at Rich Gulch, under management of Kavanaugh & Lewis, of Colorado, operations will soon be on a large scale. A 6-drill compressor and other machinery have been shipped in.

Royal Consolidated.—At this mine at Hodson a 120-stamp mill is being erected. Meantime the present 40-stamp mill continues to work.

Salvator.—Work is to be resumed on this property near Mokelumne Hill.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

Gold Bluff Lumber and Mining Company.—This company is working a dredger on ocean beach sands in a lagoon, near Orick. The washing plant is not large enough to handle the sand supplied it.

Goldie Lee.—J. W. and Waldo E. Lee have taken up 40 acres of mining land on the Klamth River under this name.

KERN COUNTY.

(From Our Special Correspondent.)

Caliente Mining Company.—The property of this company, at Caliente, has been bonded by W. M. Kerkhoff, of Chicago, and a force of men will be put on at once.

Red Rock Gravel Mining Company.—This company near Randsburg, is to put in a gasoline engine pumping plant.

Sunshine.—This mine at Randsburg, under lease to T. and W. Atkinson, has had a small mill run with results of $301 per ton gold.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Golden Gate.—At this mine, near Whitlock, a new canvas plant is used with satisfactory results.

Imperial.—At this mine, near Whitlock, a shaft house has been built and work on the shaft begun.

McLeish Mill.—M. McLeish, who is working tailings at Mount Bullion by cyanide, is about to increase the capacity of his plant from 30 to 70 tons per day.

MONO COUNTY.

(From Our Special Correspondent.)

Golden Gate.—The offer of C. D. Lane for this mine at Antelope Valley has been refused by Wedekind & Blackburn.

Masonic Mountain.—A strike is reported from this place, 16 miles from Bodie, in the mine of Guy Pritchard and M. Davis.

MONTEREY COUNTY.

(From Our Special Correspondent.)

Mother Lode Company.—The mill at this mine is running under the new management of J. S. Williams. A good run has been made.

Ralston Company.—The mine, near Mansfield, is reported yielding good ore.

PLACER COUNTY.

(From Our Special Correspondent.)

Black Canyon.—The new 10-stamp mill at this mine has started.

Deep Canyon.—At this mine, near Last Chance, M. Savage superintendent, a 5-stamp mill is running steadily.

Rising Sun.—This mine and adjoining properties, near Colfax, are being reopened and electric power is to be used. The Rising Sun was formerly a producer and gave employment to over 100 men.

SACRAMENTO COUNTY.

(From Our Special Correspondent.)

Blue Ravine.—At this mine, the pioneer of the drift mines, near Folsom, some good ground is being opened. Some small nuggets are being found.

Cox & Finch.—Operations on this mine, near Folsom, will be resumed, arrangements having been made with the holders of the bond on the Natoma Ranch.

Homestead Mining Company.—Machinery is being hauled to the Mette Ranch, near Folsom, where this mine is located, and active development will soon begin.

Prosperity.—This drift mine, near Folsom, has been attached by creditors, but the amount is small. The company is opening ground near where the Blue Ravine Company first started work.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

Dewey.—At this old mine, near Julian, some very rich ore has been found.

Gladys Mining Company.—This company is working the Noble mines at Pine Valley, near Descanso. It has a 5-stamp mill and 2 Lane slow-speed rollers to crush the ore.

Stonewall & Cuyamaca Mining Company.—This company has been incorporated to work the old Stonewall Mine at Cuyamaca, formerly belonging to the late Governor Waterman. The mine was once a very large producer, and is well equipped with mill, machinery, etc.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Colorado River Transportation Company.—This company has launched at Needles a steamer 115 ft. long for carrying ores from along the Colorado River, where there are mines on both sides. F. L. Hawley is manager and captain. There is considerable activity in mining along the Colorado River at this time.

Crystal Springs.—In this mine in Turquoise District, 60 miles southeast of San Bernardino, some very rich ore has been found. Several rich pockets have heretofore been found in this locality.

Pittsburg Group.—In the Little Pittsburg Mine in the Old Woman's Mountains, a strike of gold and silver ore has been made. The mine is owned by G. D. Collins and operated by A. E. Price.

SAN LUIS OBISPO COUNTY.

(From Our Special Correspondent.)

Chrome Mines.—These mines, once productive, have been idle some years. The most noted are the Pick and the Shovel, on which much work has been done. The concentrating works at San Luis Obispo have been inoperative some years. Recently some of the abandoned claims have been relocated by J. R. Merchant for W. C. Doak & Co., of St. Louis, Mo., who, it is expected, will shortly start work.

SANTA CLARA COUNTY.

(From Our Special Correspondent.)

Guadalupe.—At this quicksilver mine, owned by the Century Mining Company, some good ore is taken from the old workings. The mine has been closed many years, but is being reopened. The pumps have been some months freeing the mine from water.

SHASTA COUNTY.

(From Our Special Correspondent.)

Modoc Chief.—At this quicksilver mine, 18 miles east of Redding, Samuel Ball is superintendent. A strike of high-grade ore has been made.

Mount Shasta Gold Mines.—In those mines at Shasta, F. E. Ware superintendent, a strike of high-grade ore is reported.

Mountain Copper Company.—The strike is not yet settled, and the works still remain closed.

Placer Mines.—In different parts of this county, notably at Shasta and Keswick, gulch and placer miners are doing well. Many of the Keswick strikers are putting in idle time panning in the gulches.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Eastlick Brothers.—A new hydraulic elevator is to be put in the Eastlick Brothers' claim at Oro Fino, owned by S. R. Gardner. There is plenty of water, and the giants keep steadily busy.

Punch Creek.—This quartz mine at Humbug will carry on more extensive operations as soon as weather permits.

Rhymal.—This mine, near Henley, recently struck a good vein of gold ore.

River Placers.—The recent cold weather has stopped the river miners, and has caused shut downs at several mines on account of the freezing of water supply.

Whitney.—Near Oak Bar, Whitney & Co., owners, have pumped out this gravel claim and will shortly start taking out gravel.

SONOMA COUNTY.

(From Our Special Correspondent.)

Eureka Quicksilver Mining Company.—The directors of this new company are J. F. Barber, of Oak-

land, and W. S. Davis, H. L. Lightner, C. F. Cormack and B. Romaine, of San Francisco. The capital stock is $100,000, in shares of $1 each.

Socrates Quicksilver Mining Company.—This new company is organized under the laws of Nevada, with principal place of business at Reno. The trustees for first 6 months are George M. Pinney, A. H. Ricketts and H. G. Smith, of San Francisco. The capital stock is $25,000 in 5,000 shares.

TULARE COUNTY.

(From Our Special Correspondent.)

Minnie-Ellen.—The new mill on this mine on Deer Creek, near Porterville, T. H. Welch superintendent, has made its first clean-up, reported satisfactory. The rock crushed came from the 50-ft. level. The shaft is down 125 ft. The rock crushed showed values of $20 per ton. C. S. Cox and F. M. Cook own the property.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

John Royal.—This mine, near Columbia, has been bonded by S. W. Blakely, and work will begin at once.

Meadow Lake Reduction Company.—This company has purchased the Mason chlorination plant at Sonora, and is reconstructing and improving it, J. C. Starkweather is superintendent.

Mohican.—At this mine, near Carters, Superintendent Felix Chappelet is making many improvements. A compressor and hoist will soon be installed. The mine is to be lighted by electricity.

Nonpareil.—A. P. Dron has put a small force at work on this mine at Big Oak Flat. A 75-ton mill test will be made.

Snowflake & Temescal.—At this mine, near Confidence, Redding & Hayes have started sinking.

Woodside.—At this mine in Table Mountain, near Columbia, miners are breasting gravel. Several nuggets have already been taken out.

COLORADO.

The Colorado-Utah Construction Company, which is building the Moffat road, has let a contract for 10,000 tons of 80-lb. steel rails for use on the first divisions of the road now under construction. The contract was awarded to the Colorado Fuel and Iron Company, and under its terms the rails are to be delivered at any time when called for by the construction company, within this year, the first delivery to be made in April. The contract price is understood to be in the neighborhood of $300,000. The employees of Orman & Crook have the grading on the sections assigned to that firm under headway. The other contractors, George S. Good & Co., are receiving car-loads of material, machinery, stock and other material.

CHAFFEE COUNTY.

Saguache Placer Mining Company.—This company has been incorporated under Colorado laws with $1,500,000 capital stock. The officers are: President, William C. Stone, of Watertown, Wis.; vice-president, Samuel W. Watkins, of Milwaukee; treasurer, Dr. Horace M. Brown, of Milwaukee. The directors are William C. Stone, Watertown, Wis.; C. Hood, Emporia, Kan.; H. M. Brown, Milwaukee; S. W. Watkins, Milwaukee, and H. W. Underwood, Milwaukee. The home office will be located in Milwaukee. The lands owned by the company comprise 4,200 acres of placer lands, located in the Saguache Mountains in Lake and Chaffee counties. It is stated over 100 test pits have been sunk on an area of some 2,000 acres of the company's lands, showed gravel values ranging between 5 and 25c. per cu. yd. Surveys are made for a permanent ditch some 22 miles long to furnish water for sluicing purposes the year round.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

Consolidated Gem.—It is stated at the office of Manager W. E. Renshaw, Idaho Springs, that the company will equip all of its properties and mills with electricity supplied by the Seaton Company.

Dunbarton Mining Company, Limited.—This company owning property in the Briffith District is in debt, and the property is to be sold by the sheriff to satisfy a judgment.

Kelly Tunnel.—This company is driving a tunnel at Georgetown to reach a big group of claims and has opened 3 blind lodes in a distance of 2,000 ft. The best record with machine drills is being made this month. Drifting is also under way with drills on 2 of the lodes, which show both gold and silver.

Pioneer.—This property at Dumont is starting up again by parties, who a year ago caused an indebtedness of several thousand dollars yet outstanding. It is stated that a contract is being let to clean out the shaft and drive levels. F. L. Burton, who created considerable notoriety in Boston by collecting accident insurance from the New York Central road, and who is now out on bail, claims to have capital back of the undertaking.

Sun & Moon Mining and Milling Company.—A cave of rock in the raise being put through from the Newhouse Tunnel to connect with the mine shaft on January 7 resulted in the death of one man and the fatal wounding of another. The coroner's jury found the company guilty of gross negligence. It is claimed by Manager H. N. Sims that the verdict was dictated by the miners' union, on which Mr. Sims has been making warfare for sometime. Mr. Sims is also prominent in the Mine Operators' Association of Colorado, and the miner's union officials desired to obtain a coroner's verdict censuring the Sun & Moon Company. The company carries employers' liability insurance so that should litigation start it will be defended by the insurance company. The State mine inspector examined the workings after the accident and exonerated the company.

GILPIN COUNTY.

(From Our Special Correspondent.)

Avon Mining Company.—This company, in which Philadelphians are interested, has purchased the San Juan Mine on Quartz Hill, and the Gilpin Tramway Company is putting in a track so that the shipments can be made to the mill owned by the Avon people. W. C. Dennison, Central City, is in charge.

Clear Creek Mining and Reduction Company.—The daily shipments have been increased to about 150 tons, of which 100 tons is handled at the Rocky Mountain concentrator at Black Hawk, the balance going to the smelter at Golden. The ores are mostly taken out of the 10th level of the Saratoga Mine. The ore body is over 20 ft. wide. Employment is given to 130 men. A large first motion hoister of over 200 h.p. capacity is to be installed, and the shaft will be sunk deeper, it being down 1,000 ft. E. R. Nelson, Russell Gulch, is superintendent.

Hampton Consolidated Mining Company.—The Hampton Mine shipped last week three car-loads or 75 tons of enargite ore to the Golden Smelter. The first-class ores carry values of from $40 to $60 per ton, while the second-class ores range from $20 to $35 per ton. The ores carry as high as 20 per cent copper. N. C. Hughes, Central City, is manager.

Yankee Consolidated Mining, Milling and Tunneling Company.—President and General Manager Henry I. Seeman, with main office at Equitable Building, Denver, Colo., announces that the company will spend $100,000 in improvements at the property in Yankee District, 9 miles west of Central City, during the present year. The erection of a 100-ton amalgamating and concentrating mill for company ores, as well as some custom ores, will be erected. The motive power will be electricity. The Lombard and Faust mines will be connected by tramway to the mill, a distance of 1½ miles. Heavier operations will be carried on at the Faust, Lombard and Manhattan properties, and it is expected that close to 100 men will be employed.

LA PLATA COUNTY.

Neglected Mining Company.—The suit of P. A. Larsh against this company has been heard at Durango before Judge Russell. Counsel for Larsh requested the court to permit an accounting of the production of the mine on the theory that if it is proved that the mine paid for itself Larsh shall recover one-fourth under a contract made in July, 1901, which required Larsh and J. J. Gorman to procure credit with the merchants and protect the quarterly payments of $2,000 to hold a lease in the name of William Boyle. Judge Russell confined counsel to the figures of production up to October 15, 1901, when, it is claimed by the defense, Larsh's contract ceased to exist.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Ore Shipments.—The tonnage for the first half of January shows average shipments of 2,300 tons daily of all classes of ore. There is a slight increase in siliceous ores, and oxidized iron, and a further increase is promised shortly by the resumption of shipments from the Resurrection and Dolly B.

Zinc Ore Increase.—The greatest surprise in the figures of work done during 1902 was the zinc output, zinc showing the heaviest valuation of all the metals produced, being a total of $3,103,448. This is an increase of over $2,500,000 over 1901, while 5 years ago the zinc values were thrown away. The A. M. W. Mill alone produced 20,000 tons of zinc concentrates, and the A. Y. & Minnie 6,000. The completion of the new mill at the Resurrection property means another zinc addition in the near future.

Belgian.—Hendrickson & Co. are the new lessees on this Iron Hill property. They are prospecting in virgin ground while developing and shipping about 200 tons a month of low-grade siliceous ore.

Best Friend.—Lessees have a new tunnel on this gold belt property in 120 ft. The tunnel is 4 by 6½ ft. in the clear, and will cut the old shaft at 170 ft.

Fanny Rawlings.—Lanphier & Co. have a lease on the north end of this property and in sinking a new shaft have ore exposed at 65 ft. in a drift. It is gold-bearing and over 2 ft. thick.

Garibaldi Tunnel.—W. L. Cooper has just resumed operations on this tunnel, having secured it under lease from the Garibaldi Mining Company. It is in quarter of a mile, and passed through large bodies of low-grade iron ore.

La Belle Mining Company.—This company, headed by P. J. La Belle, has a lease on a part of the Black Prince claim on Breece Hill, and is resuming after a long idleness. Mr. Thomas Ovens is in charge of the new work.

Little Bob.—George Campion has resumed operations on this gold belt proposition.

Midas Mining Company.—This company, which shipped 70,000 tons of oxidized iron last year and has the greatest iron shoot ever opened in the Leadville District, has through the management, Messrs. Nicholson and Rodman, just closed a lease with the Wolcott Mining Company for the Colorado Mine on East Seventh Street. This gives the Midas 20 acres more ground to the north.

New Leadville Home Mining Company.—The company having arranged its financial affairs is pushing development work in virgin territory, and also shipping 100 tons a day of oxidized iron.

O'Neil.—This is one of the new shafts going after the ore shoot caught in the Progressive territory on Fryer Hill. A heavy flow of water near the surface has made it necessary to abandon work, and the company is figuring on starting a shaft higher up. J. J. O'Neil is at the head of the company.

Phoenix Mining Company.—This company is handling 150 tons a day of iron, a part of which goes to the steel works at Pueblo. It has been operating the Sixth Street shaft, and the pumping has been through the Coronado. Just how it will be effected by the new lease to the Midas Company is not known.

Progressive Mining Company.—The shaft on the Cady, where the lead carbonates were caught, is being sunk, and some ore averaging $100 a ton is taken out. The company has its new shaft down 100 ft.

Republic Smelting and Refining Company.—This concern that secured the old Boston Company's pyritic plant here also owns the new smelter at Salida and the New Monarch Group of mines here. Manager Timothy Goodwin has closed a contract for 3 new furnaces here, and railroad tracks and other preparatory connections are being made.

Valentine Mining Company.—This reorganized company operating the Valentine shaft in the downtown district is handling a steady flow of 800 gal. per minute. A station is being completed at the 500-ft. level for a large Knowles pump. The old workings are in fair condition, and prospecting has begun.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

Alta Mines Company.—Much of the machinery in the mill, in Turkey Creek Basin, is being torn out preparatory to installing 20 stamps with tables. Alta ore is a heavy silver-lead, carrying small values in gold. Outside of what is sufficiently high grade to ship to smelters crude, the only method of treatment is concentration. The plant may be in operation by spring. A. C. Koch, of Telluride, is resident manager.

Butterfly-Terrible Gold Mining Company.—A large shoot of rich gold ore is reported cut in the Ida vein at a depth of 300 ft. below the lowest of the upper workings. The vein was cut by the tunnel at 2,000 ft. in from its mouth. The pay streak is from 4 to 5 ft. wide, and averages between $39 and $40 per on the plates by amalgamation. The ore runs exclusively in gold, and is free milling. The rich shoot is from 500 to 700 ft. long by 300 ft. high. On account of the scarcity of water the mill is not running full capacity, and it will probably be spring before all stamps are dropping.

Smuggler-Union Mining Company.—This company's 80-stamp mill at Pandora, 1½ miles above Telluride, started work December 27, having been idle since November 21, the date of the assassination of A. L. Collins. The plant has since been treating between 250 and 300 tons of ore every 24 hours. There are about 150 men employed in the Smuggler-Union Mine, which is furnishing about two-thirds of the ore supply, the other third coming from the Contention group in Bear Creek, 3 miles from the Smuggler-Union, the mill being situated between the two with tramway connections to each. There are about 30 men working on the Contention, a gold proposition. The company's 60-stamp mill will start early in the spring, or as soon as the pipe line to Bridal Veil falls thaws out. O. B. Kemp, who was chief clerk and confidential man to Mr. Collins, has been appointed general superintendent, and Bulkeley Wells, of Boston, vice-president of the company, becomes general manager.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Doctor-Jack Pot.—A small shipment of very rich ore is reported from the Elizabeth claim. The property is worked almost entirely by leasers.

El Paso Drainage Tunnel.—Work has started on this tunnel, which has its portal in Cripple Creek Canyon, a short distance above the Gold & Globe Mill, and when completed to the El Paso Mine, will be a little over 4,000 ft. long. The tunnel will be 6½ by 4½ ft. in the clear, and will be driven from several headings. It will cut the El Paso shaft at its lowest level, 600 ft., and the Elkton, when reached at 940 ft. It is thought by many mining men that it will not be necessary to run it to the Elkton to drain that property. The tunnel is being put through by several mining companies that own property in the vicinity. The contract was let to the El Paso Company, and it is understood that a provision calls for completion within 7 months. This is a decided step toward the drainage of the district, and will give at least temporary relief to some mines. A number of other drainage projects are being looked into.

Findley Gold Mining Company.—At the annual meeting the old board of directors was re-elected, consisting of J. H. Hobbs, J. S. Tucker, J. J. Key, G. R. Buckman, W. K. Dudley and F. L. Ballard. Mr. Hobbs was elected president and treasurer, and Mr. Key secretary and vice-president. The reports of the officers showed that during the year past the property has produced about $80,000 worth of ores, and that the company's affairs were in a promising condition. The shaft has been sunk 1,400 ft. The company is working the property, and there are no leases upon it. During the year levels were run to and upon the vein at 900, 1,000, 1,100 and 1,200 ft.

Free Coinage Gold Mining Company.—A number of leases have been granted. The property is situated at Altman, on Bull Hill, and was originally controlled by the late Sam Strong. J. B. Neville is at present general manager.

Gold Sovereign Mining and Tunnel Company.—At the annual meeting the following directors were elected: A. E. Carlton, E. C. Newcomb, G. F. Fry, W. A. Delaney, W. F. Rock, C. N. Miller and A. Rapp. The treasurer's report shows the company in fair condition, having nearly $14,000 in cash on hand, against $11,000 a year ago. During the year 758 tons of ore were shipped, on which the net smelter returns were $15,479, the royalties on this being $3,826. The general manager's report shows that the main shaft was sunk 100 ft. during the year, making it about 550 ft. deep. All of the company's property is worked under lease at a royalty of 25 per cent flat.

Golden Cycle Mining Company.—The directors have declared a monthly dividend of 1 per cent per share, making $15,000. Hitherto the monthly dividends have been ¾ cent per share, or $11,250 per month. The outlook on and the large treasury reserve justify the new rate. The litigation between the directors is progressing without much excitement.

Stratton's Independence, Limited.—This company has filed in the Federal Court a suit for $6,000,000 against the executors and trustees of the Stratton estate and also against I. Harry Stratton, heir at law. The complaint alleges that the mine was "salted" before the sale, negotiated through the Venture Corporation, of London.

Stratton Properties.—It is expected that in a few days a large amount of the Stratton property will be leased; a great number of applications having been made, several for each block of ground. Mr. Rice, manager of the properties, has been ill for some days, and in consequence action has been postponed.

Vindicator Gold Mining Company.—The stockholders at their annual meeting elected these directors: F. L. Seigel, president; F. J. Campbell, secretary and general manager; G. S. Wood, vice-president; A. J. Zang, treasurer. The company did very well in 1902, paying dividends of $253,000. The Vindicator vein on the 1,000-ft. level is showing up very well, and some veins have also been opened up on the 1,200-ft. level. According to its capitalization the Vindicator is now paying the highest rate of dividend in the district.

IDAHO.

LEMHI COUNTY.

(*From Our Special Correspondent.*)

Boston-Idaho Mining Company.—The new officers are R. P. Hunter, of Ogden, Utah, president; F. H. Clayton, of Boston, Mass., vice-president. The company's property is in the Warm Springs District. The shaft in the Shamrock claim is reported down over 250 ft.

SHOSHONE COUNTY.

Coeur d'Alene Mine Valuations.—The valuations placed on the different producing mines of this district by the county assessor are: Bunker Hill & Sullivan, $658,680; Coeur d'Alene Mining Company, operating the Crown Point in Government Gulch, $66,200; the Coeur d'Alene Development Company, $108,150; the Empire State-Idaho Mining Company, operating the Last Chance and the Tiger-Poorman, $1,168,340; Frisco Consolidated, $615,090; Golden Chest Mining Company, $111,425; Gold Hunter Mining Company, $223,000; Hercules, $50,808; Hecla Mining Company, $313,260; Morning, $669,370; Mammoth, $551,200, and the Standard Mining Company, $608,350.

Hidden Treasure Mining Company.—At the recent annual meeting, at the office of the Empire State-Idaho Mining and Development Company, in Spokane, the following board of directors was elected: Charles Sweeny, A. B. Campbell, John A. Finch, Bruce Clendenning, William J. Hall, H. R. Allen and E. J. Roberts. The property is located in the Coeur d'Alenes, but has not been worked for several years.

Standard Mining Company.—This company has ordered electric pumps, which will be working May 1. The estimated cost is $30,000. The pumps have a capacity of 500 gal. per minute, and will be constructed as 2 separate units. They will be installed on the 1,000-ft. level, and the compartment is being cut. The pumps used now have a capacity of 150 gal. per minute. The power will be supplied by the Washington Water Power Company, which has cleared its right of way for the line, and has posts set for over half of the distance. The Standard Company will also use electricity for the compressor. Twenty-six drills are now operated.

ILLINOIS.

MACOUPIN COUNTY.

According to a press dispatch Milton McClure, of Carlinville, has secured 40,590 acres of coal land in one body.

The land lies in a portion of six townships—Carlinville, Shaw's Point, Brushy Mound, Gillespie, Cahokia and Honey Point. The vein is said to run from 7 to 10 ft. thick.

INDIANA.

SULLIVAN COUNTY.

(*From Our Special Correspondent.*)

The recent discovery of coal in the western part of this county has caused unusual activity and several tracts of land have been purchased by Pennsylvania and Ohio operators. Five drills are at work on 1 piece of 3,000 acres, and the veins found compare favorably with the best in the eastern part of the county.

Mammoth Vein Coal Company.—This company, composed of Ohio operators, is sinking 2 large shafts west of the Evansville & Terre Haute tracks, near Shelburn.

United States Steel Corporation.—This concern, represented by Judge Henry, of Terre Haute, and James Branson, of Farmersburg, has secured options on 2,000 acres of coal land in this county, and abstracts are being prepared to close the deal. The Corporation already has 1,200 acres in this county.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Atlantic.—The output for December was 294 2-5 tons of mineral.

Baltic.—The December product was 496 tons of mineral.

Champion.—This mine produced 519 tons of mineral in December, an increase of 99 tons over the previous month.

Copper Range Railroad.—The Calumet extension is completed to Dollar Bay, and a gang of 75 men is laying rails beyond that point. The extension greatly facilitates transportation of mineral from the mines south of Houghton to the various Portage Lake smelters.

Isle Royale Consolidated.—The diamond drill explorations on section 11 have not revealed anything of value yet.

Lake Superior Smelting Company.—The reverberatory furnaces at the Hancock works are again in commission. An increased amount of mineral is being handled from the mines south of Portage Lake.

Osceola Consolidated.—The Tamarack Junior branch has stopped production and the remaining force of 125 men were discharged last week. Work is now confined to the sinking of a winze from the bottom of No. 2 shaft, 3,250 ft. from surface. The output for December was 650 tons of mineral.

Rhode Island.—The cross-cut from the bottom of No. 2 shaft, 1,000 ft. from surface, has penetrated rich ground.

Tamarack-Osceola Copper Manufacturing Company.—This company has resumed work at its wire mill at Dollar Bay. The company is owned by the officers and leading stockholders of the Osceola and Tamarack mines.

Winona.—The December production of mineral was 59½ tons, made with one stamp at the Atlantic Mill working 20 days. All rock came direct from the mine openings.

Wolverine.—This mine made 563 3-5 tons of mineral in December.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Mohawk.—Sinking in No. 1 shaft is in progress to the 9th level. The December product of 1 stamp for 19 days was 150 3-5 tons of mineral. The rock averaged 28 lbs. of fine copper to the ton, or 1¾ per cent mineral.

Phoenix Consolidated.—The St. Clair shaft has been repaired and is completed to a depth of 2,500 ft. The hoisting engine has been enlarged. Work on the 1-head mill on Eagle River, 1 mile from the mine, is nearing completion.

COPPER—ONTONAGON COUNTY.

(*From Our Special Correspondent.*)

Adventure Consolidated.—The Butler Tunnel has encountered the Evergreen lode 750 ft. from its mouth. The lode is strong. Forty drills are in commission, and rock shipments to the stamp mill average 900 tons daily. Two heads at the new mill are working.

MONTANA.

BROADWATER COUNTY.

H. & H.—A test of several hundred tons of ore of the waste dumps of this mine at Winston at the Corbin concentrator, showed that about 3,000 tons can be treated by concentration at a profit. It is the plan of the party who has leased the dumps to equip the old Iron Age Mill on Beaver Creek with a suitable concentrator.

FERGUS COUNTY.

Gold King Mining Company.—At a meeting of the directors of this company at Livingston, steps were taken toward consolidating the Gold King and Bear Gulch properties, in pursuance of the recent agreement. A. J. Campbell, of Butte, was elected president of the company, and a meeting of the stockholders was called for January 28.

GRANITE COUNTY.

Granite-Bimetallic Consolidated Mining Company.—This company is reported to have placed an order for 200,000 ft. of lumber for immediate delivery at the Bimetallic Mill at Philipsburg. The lumber is intended for Granite, where the company has many improvements at its works under contemplation.

(*From Our Special Correspondent.*)

Butte & Garnet Gold Mining Company.—This company has been organized with a capital of $100,000 to take over and operate the Grant & Hartford Mine at Garnet. Charles Griner, of Butte, is president, and H. T. Lewis, of Butte, secretary. The company will build a concentrator in the spring. The ore is an iron sulphide, with gold values.

Sunrise Mining Company.—This property, near Phillipsburg, and under the management of Frank D. Brown, is to have its milling capacity increased by the addition of 20 stamps to the present 10-stamp mill. Charles D. McClure, of St. Louis, Mo., is the principal owner.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Buckeye.—C. J. Davis, of Michigan, who has operated this property situated 12 miles from Basin, on a lease and bond given by the executor of the real estate, is expected to return from the East during the present month, when it is announced operations will be resumed and a new shaft sunk.

White Pine.—Stouwe & Smith, of Helena, have taken a bond and lease on this property at the head of Worm Springs Creek. They are driving a tunnel to top the ledge about 100 ft. below the old workings. The property lies east of the B. & G., and south of the Bell. The latter property has produced $275,000 in the last 3½ years under the ownership of C. W. Fleming.

LEWIS & CLARKE COUNTY.

(*From Our Special Correspondent.*)

Argo Copper Mining Company.—Messrs. Carroll & Martin, of Helena, who are managing the affairs of this company, are making regular shipments of copper sulphide ore to the National Smelting Company, Rapid City, S. D. The copper content of the ore is better than 20 per cent, and an iron gangue makes it a favorable ore for a pyritic smelter.

East Helena Smelter.—This plant of the American Smelting and Refining Company is receiving all the copper-iron matte produced by the Golden Reward Smelter at Deadwood, and the National Smelter, located at Rapid City, S. D. This appears like carrying coals to Newcastle, especially as the copper content of this matte originated in Montana.

MADISON COUNTY.

Liverpool.—Twelve men are employed in sinking a shaft at this mine in Lump Gulch. Upon starting the new hoist recently sinking was commenced at the 400-ft. level and has now reached the depth of 475 ft. At the 500 a cross-cut will be run to the lead. It is the plan of the company to sink 1,000 ft., and see if

the ore holds out to that depth, in quantity and value.

POWELL COUNTY.

Gladstone Mining Company.—The new 10-stamp quartz mill being erected by this company about 3 miles west of Pioneer is expected to be finished and ready in about a week.

(*From Our Special Correspondent.*)

Washoe Smelter.—Fire has destroyed the storage bins for coal, coke and concentrates for the blast furnace department of this plant. The loss which may amount to $60,000, was confined to that part of the works, and the plant, if closed at all, will be idle for a few days only.

SILVER BOW COUNTY.

According to the State mine inspector's report the Anaconda Company employs 2,356 men underground, 468 top men and 29 engineers. The Boston & Montana Company employs 1,158 men, 980 underground, 153 top men and 23 engineers. The Butte & Boston employs 464 men underground, 83 on top and 12 engineers. The Montana Ore Purchasing Company employs 1,127 men underground, 115 on top and 15 engineers. The Colusa-Parrot Company employs 557 men underground, 49 on top and 9 engineers. The Parrot Mine employs 389 men altogether. The Colorado Company employs 380 men. The Washoe Company employs 153 men.

(*From Our Special Correspondent.*)

Sailor's Dream.—This group of 6 quartz claims, situated near the head of Brown's Gulch, has been purchased by the Homestake Mining Company, whose property lies adjoining. A 2-stamp gold mill has been running on the Sailor's Dream property for some years. The Consolidated Company will, it is claimed, build a 10 or 20-stamp mill in the spring.

NEW MEXICO.

BERNALILLO COUNTY.

(*From Our Special Correspondent.*)

Bland District.—This district, which has been quiet for some time, promises soon to be one of the busiest in New Mexico. The Alamo Reduction Company, with a capital of $500,000, has secured control of some of the principal properties of the district. The plans, which the company has given out, include the erection of a modern concentrating plant with a daily capacity of 500 tons, to begin systematic development work at several points on its holdings. To give an outlet for the ore, the New Mexico Northern Railway Company has been organized with a capital of $100,000, to build a line from Bland to a point near Thornton on the Santa Fe. This line will be of standard gauge, and no extensive mining operations will begin until the railroad is underway. The headquarters of both companies will be in Albuquerque. The officers of the new corporation are R. R. McKinnie and P. L. McKinnie, of Chicago, Ill.; D. C. Dunley, A. L. Allen and G. S. Cook.

GRANT COUNTY.

(*From Our Special Correspondent.*)

Comanche Mining and Smelting Company.—This company has a capitalization of $5,000,000. It intends to work the Comanche group and other neighboring properties in the vicinity of Silver City. It is stated that work on a 200-ton reducing plant will begin at once. C. S. Curry, of Ironwood, Mich., is president of the company, and C. B. Atkinson, vice-president.

The Sampson group of mines, owned by Robert P. Thompson and G. H. Sublett, has been turned over to the Comanche Company.

Granite.—This mine, at Stein's Pass, operated by Reed Brothers, is now shipping several cars a week.

International Gold Mining and Milling Company.—This company, operating at Malone in the Burro Mountains, has put a large force of men to work the gold and silver properties controlled by it, and will soon erect a large mill for the treatment of the ores. The president of the company is Dr. M. C. St. Clair, Grand Rapids, Mich.

Lena Mining Company.—The sale of this company's properties at Lordsburg is reported. The concentrating plant was leased a short time ago by Dr. M. M. Crocker, trustee, to E. L. Burkey, of El Paso.

National Gold and Silver Mining Company.—The capital stock is $3,000,000. The mines and works are located at Stein's Pass. Chicago, Ill., men are the organizers.

PENNSYLVANIA.

ANTHRACITE COAL.

Philadelphia & Reading Railroad.—The Pennsylvania Railroad Company, on behalf of the Baltimore & Ohio, has disposed of half its holdings in the Philadelphia & Reading to Vanderbilt interests, according to press reports. The amount of Reading stock held by the Vanderbilts and the Baltimore & Ohio is reported to be short of a majority, and to be mainly first and second preferred stock. It is said that the Vanderbilt holdings will be lodged with Lake Shore, giving that road an entrance to Philadelphia. The Reading also connects with the Beech Creek division of the New York Central. It is also said that the house of J. P. Morgan & Co. is no longer a large owner of Reading securities, and that present indications show that the Pennsylvania and the Vanderbilt interests will control all the anthracite railroads. The lines not known to be controlled by these interests now are the Lehigh Valley, New York, Ontario & Western, and the Delaware, Lackawanna & Western. The Vanderbilts, however, own considerable Lackawanna stock.

SOUTH DAKOTA.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

Leroy Gold Mining Company.—Returns of $14.60 a ton gold are reported received from the car-load of ore recently shipped to Denver for treatment. The shaft is being continued on the fissure.

Mayflower Gold Mining Company.—The contract has been let to Henry Pilger to sink 50 ft. more on the shaft, making it 150 ft. deep. Prospecting is also under way on various other veins.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Anaconda Gold Mining Company.—Officers and directors have been elected as follows: F. H. Herhold, of Chicago, is president; W. E. Hahn, Warren, O., vice-president and secretary; C. L. Wallace, Chicago, treasurer; F. Herhold, Chicago; Nels Nelson and J. P. Wilson, Lead, S. D., directors. Nels Nelson, Lead, is manager. Steam hoist and pump and Ingersoll-Sargeant air compressor and drills are being delivered at the mine. The shaft is 125 ft. deep.

Homestake Mining Company.—The new air compressor at the Ellison hoist and nest of boilers are installed and connections are being made. The new compressor is large enough to run 200 drills, and will double the mine's air power.

Horseshoe Mining Company.—The framework for the new 1,000-ton cyanide plant at the Mogul Mine was demolished by a gale, involving a loss of $5,000, and delaying the completion of the mill several months.

Imperial Gold Mining Company.—W. B. Milliken, who built the cyanide mill, has resigned as mill superintendent, to be succeeded by John T. Milliken. The mill is being enlarged to 250 tons daily capacity. It is receiving 3,000 tons of ore a month from Imperial mines and 700 tons from the Portland Mining Company.

Pluma Gold Mining Company.—The aerial tramway connecting mine and mill is being repaired, and more buckets added. It is 4,000 ft. long and drops 400 ft. The main Pluma shaft is 410 ft. deep. The west crosscut on the 300-ft. level is 150 ft. long. The crosscut will be continued to the Hawkeye shaft, 500 ft. from the Pluma shaft.

United Ruby Gold Mining Company.—Articles of incorporation have been filed and officers elected. W. J. McGoffin, Roubaix, S. D., is president; Erick Kalen, Roubaix, S. D., vice-president; J. A. Ogden, Deadwood, S. D., treasurer; C. H. Miller, Deadwood, secretary; C. A. Anderson, Roubaix, superintendent. The company controls 271 acres and is following a vein of free milling ore.

Yellow Jacket Gold Mining Company.—A charter has recently been obtained. Levi McGee is president; O. L. Cooper, vice-president; J. F. Cooper, second vice-president; E. S. Pew, secretary; A. K. Thomas, treasurer; George Hughes, superintendent, and E. L. Hurlburt, director. All are residents of Rapid City, S. D., except J. F. Cooper, Mitchell, S. D. The company owns 140 acres, on which improvements are being made.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Settlements.—The banks report settlements for the week ending January 8 as follows: Bullion, $311,800; ores, $220,400; gold bars, $40,910; total, $573,110.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Cactus.—Developments underground are reported satisfactory. Twenty-five men are reported on the payroll.

Estella.—This property under the supervision of Gen. Penrose, reports striking in a lower tunnel ores found in a level above, which ran $50 gold to ton.

Majestic.—The latest developments in the Old Hickory, as reported by Manager Farish, show this claim superior to the O. K. An ore-body has been cut that assays high in copper.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—The shipments for the week ending January 8 are: Eagle & Blue Bell, 3 cars; Mammoth, 2 cars; Bullion-Beck, 6 cars; Eureka Hill, 7 cars; Gemini, 5 cars; Grand Central, 25 cars; Yankee Consolidated, 10 cars; Lower Mammoth, 1 car.

Joe Bowers.—George Poxtor, a veteran miner, has taken a lease.

Lower Mammoth.—The ore-bodies fro mwhich the last bulk of shipments has been taken are in a measure worked out, but developments have opened a new body in virgin ground, which carries gold values.

PIUTE COUNTY.

Franklin Gold Mining Company.—This company has a capital stock of $500,000, divided into shares of the par value of $1 each. P. A. H. Franklin is president; L. N. Morrison, vice-president; M. F. Murray, secretary, and M. J. True, treasurer. The company owns the Snowbird Nos. 1, 2, 3 and 4, the Franklin, Magpie, Summit Fraction, Sunshine Fraction and North Fork Fraction lode claims in the Mt. Baldy District.

SALT LAKE COUNTY.

Boston Consolidated Copper and Gold Mining Company.—This company has elected as directors, to fill vacancies, Count Ward, of London; Frank A. Schirmer and E. E. Abercrombie, of Boston. M. I. Newhouse has also been re-elected. The company, it is stated, expended $99,671 during the past year for development work and general expenses, and has added largely to its ore reserves.

(*From Our Special Correspondent.*)

Bingham Shipments.—The samplers report receipts from Bingham as follows: Sampson, 1 car; Columbia, 1 car.

Dewey Mill.—This mill at Bingham has closed for repairs. Manager Beemus states work may not be resumed for a month.

Highland Boy Smelter.—Four cars of copper bullion were shipped East to the refineries during the week, closing January 9.

Kenebec-Gypsy-Blair.—The Kenebec Company, of Alta, has bought the Blair holdings, thus giving the Kenebec 300 acres. The price paid was 35,000 shares of the Kennebec stock.

Wall & Fox vs. United States Company.—In the Federal Court E. A. Wall, lessee, and M. C. Fox, owner of Red Rover claim, have brought suit against the United States Mining Company for the unlawful extraction of ore from Red Rover ground.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Park City Shipments.—The Mackintosh sampler reports the receipts for the week ending January 9 as follows: Daly-West, 4,581,550 lbs. ore; California, 62,500 lbs. ore; Ontario, 906,840 lbs.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Stockton Shipments.—The Ophir-Hill has resumed heavier shipments, and reports sending 18 cars of concentrates to the samplers in the week ending January 9. The Cygnet sent but 1 car from Fish Springs, The Utah sent in 2 cars of best grade ore.

Cyclone.—A contract for driving 100 ft. in the tunnel has been let.

WYOMING.

SHERIDAN COUNTY.

Sheridan Coal Company.—This company's mines at Dietz are producing between 2,400 and 2,500 tons daily. The mines employ 450 men daily and the population of the town, which was practically nothing 2 years ago, is now 1,000. During the past year the company built a new tipple at its No. 1 mine, and a wire haulage plant has supplanted horses and mules. Altogether about $200,000 has been spent in improvements, of which the larger part went for the sinking of a new shaft to the second vein of coal 175 ft. below the surface, and in equipping this new mine with the latest machinery. One of the improvements is an Ottumwa box car loader.

FOREIGN MINING NEWS.

MEXICO.

DURANGO.

(*From Our Special Correspondent.*)

Mexican Exploration Company.—It is rumored that the company is in negotiation with the present owners for the purchase of the Avino and Promontorio mines. The Promontorio Mine is the property of the Damms and their associates. The Avino mines are chiefly famous in late years for the large amount of English capital which has been sunk in them, and in changes in their working equipment without return, so far, to the confiding investors.

SOUTH AMERICA.

ECUADOR.

Playa de Oro Mining Company.—According to circulars sent out by O. S. Gage this company was organized under the laws of Kentucky in 1891. The principal stockholders live in England. Work on the plant at the mines began in 1893, a large amount of money was expended, and part of the plant was in operation in 1896, Mr. Gage resigned as vice-president of the company in 1896. but was elected a di-

rector in May, 1900. He claims that the company has held no annual meeting since then, and protests against the plan of reorganization proposed by the company, noted in these columns last week. Mr. Gage has a suit for $65,000, for money advanced the company, and interest pending in the Kentucky courts. The suit also ask the appointment of a receiver for the company.

MINING STOCKS.

(Full quotations are given on pages 138 and 139.)

New York. Jan. 14.

While the copper list is weakening the long silent Comstock shares are attracting attention. The heavy trading and rapid advances in the value of these shares give credence to the report that good ore has been opened up in Best & Belcher and Union.

Best & Belcher is the leader in the Comstock group, and although it has risen in price from $1.05 on January 2 here, and to $4.15 on January 13 in San Francisco, no stock is offered in New York. The company has levied assessments of $2,787,643, the latest being 15c. per share, now on the board. Union Consolidated, with $2,745,000 assessments to its credit, has advanced from 50c. early last week to $2.25 on January 13, and continues to rise. Mexican has been pushed up to $2.75 from 70c. on January 2, although it has an assessment record of $2,440,160. Ophir has gained $1.25 in a week, and promises to go above $2.65, the New York selling price on January 13. Its assessments to date amount to $4,794,168. Consolidated California & Virginia is strengthening, and i na week has risen $1.15, selling on January 13 at $2.40. This company has paid dividends of $3,963,600, and has also levied $937,200 in assessments. Sierra Nevada, with $6,881,910 in assessments on its books, which is the second largest amount called by the Comstock group, is benefiting from the flurry in the stock market. In two days Sierra Nevada jumped 31c. to $1.25, and is advancing. Savage gained 30c. in the same time, which is remarkable, considering that it has levied $7,399,600 in assessments. Gould & Curry went up from 38c. to $1, and is rising. Its assessments amount to $4,818,850. Overman, with $4,204,470 in assessments, and Hale & Norcross, with $5,795,880, have both advanced 20c., while Occidental, with $549,179, and Potosi, with $2,286,000, each 30c. Other shares have advanced in proportion. There is no doubt that much of this buying is purely speculative, and that the brokers who have been hanging on so long are taking profits freely.

In the copper group transactions are growing less with the recession in prices. Amalgamated has slumped from $65 to $63, and Anaconda, after gaining ⅜, dropped to $24⅛. On curb dealings are sympathetically small in the higher priced stocks, while in the lower ones there is a disposition to take fractional profits. Greene Consolidated, of Mexico, is little affected by the 2 per cent dividend, and sales of the stock have been made at $24⅛ to $23½. Tennessee is lower, losing 1¾ points to $15¾. White Knob, of Idaho, finding inside support, rose from $10½ to $11½. British Columbia weakened from $5¾ to $5, while large dealings in Montreal & Boston are reported at $2¼@$2⅝.

Colorado stocks are fatigued. Portland, of Cripple Creek, sold down to $1.85; Elkton to 35c., and Isabella to 29c.

Sales of Quicksilver, of California, are noted at $2¾@$2.85 for the common stock. Nothing doing in the preferred.

Horn Silver, of Utah, reappeared at $1.50.

At the close indications point to lively trading in the Comstocks, initiated by active bidding by the San Francisco coterie.

The Mine La Motte Lead and Smelting Company, owning property in Madison and St. Francois counties, Mo., capitalized at $3,000,000, and floated last October at $7.50 for the $10 par value shares, paid its first quarterly dividend of 2 per cent on January 15.

Boston. Jan. 13.

(From Our Special Correspondent.)

Speculation has been largely in Amalgamated, Copper Range Consolidated, Trimountain and Centennial. Rumors have been rife of various consolidations to take in these properties, and Osceola and Tamarack in addition, but it has sifted down to Copper Range and Trimountain for the present. It is felt that these two will be merged in the proportion of 1 Trimountain for 1½ shares Copper Range, and the market prices are at about this ratio. Trimountain rose to $94.50, settling to $92.50, and Copper Range boomed to $66, reacting to $63, and closing at $64.25. The record price for Copper Range is $66, and is the equivalent to $99 for the original stock before the consolidation with Baltic. Trimountain is said to be earning $6 a share, and it is expected that dividends will soon be announced. About one-third of the stock is distributed, the balance being held by a few.

It is not believed that Amalgamated figures in the deal, although ultimately this is expected to be the case. Dealings in Copper Range have been on an enormous scale, and considerable profit taking has ensued. Centennial spurted $3.25 to $24, but has reacted to $22. The ownership of this company is thought to be similar to that of Trimountain, but the fact will not be known until the annual meeting in the spring. Arcadian spurted almost $1 to $5.62½, but fell back to $4.25. No reason was assigned. United States touched $23.25, but fell back to $21.87½. Practically all of the Centennial-Eureka stock has been turned into the United States Company by the minority interest. They received 1½ United States for each share Centennial-Eureka, the same as the original terms. The United States Mining is expected to derive about $5 per share on its Centennial-Eureka stock. The latter is shipping about 250 tons of ore per day. Mohawk has been heavy, receding $1.50 to $43.50, recovering $1. The lower levels are reported as improving at this mine, being better than the ones immediately above. The activity in Trinity has subsided and the price is off 50 to $11.50.

Utah Consolidated is selling ex-dividend at $24.50 @$23.75. Adventure has fallen off $1.50 to $16, and Mass $1.37½ to $15. Osceola has lost $3.50 to $60, and Tamarack $4 to $151, with little doing in either case. Parrot has eased off $1 to $27. Calumet & Hecla spurted $22 to $520, and holds the advance. Dominion Iron and Steel has been under the influence of the trading element, and as there was no support they crowded the price down $6.50 to $55.50, with subsequent recovery to $57.25. There is a certain clique who only await an opportunity to sell this specialty down.

United Copper has dropped into obscurity again, not a trade occurring during the week. As indicating the times the Boston & Colorado Smelting Company has passed its dividend, owing to the low price of copper and silver. The company has paid 6 per cent for the past four years and 10 per cent previous to that.

Colorado Springs. Jan. 9.

(From Our Special Correspondent.)

The mining stock market commenced the year with every promise of a boom. The big mining companies of the western half of the district have decided to run a drainage tunnel and unwater the camp to a depth of at least 1,500 ft., and work on this important project was commenced yesterday. The contract was let to the El Paso Consolidated Company, which agrees to complete it in 7 months from date. The big companies are mining more economically. The result is a larger tonnage and larger aggregate returns. The companies have decided that they must do deep mining, and are consequently pushing their shafts considerably below the 1,000-ft. level.

Elkton showed a considerable advance, going from 32 to 36c. during the week. El Paso advanced from 66 to 68c. on the ground that the company is expected soon to resume dividends, and also that the new drainage tunnel will soon reach this property, it being the first big mine in line with the bore. Findley sold at 11c. all week. The annual statement of the treasurer has just been issued, showing a good financial standing. Golden Cycle held steady at 66c., while the fight in the courts drags along.

Isabella developed some strength, selling from 29 to 30½c., closing fractionally lower. A stiff fight for the control at the annual meeting on January 20 has set in between the present incumbents, President Lennox and General Manager De La Vergne, on the one hand, and the Williams-Stone faction on the other. Portland sold from $1.75 to $1.72, recovering to $1.75. The company will pay the regular quarterly dividend of 3c. January 15. Pharmacist advanced from 4⅞ to 6c., and is being bought up readily. Prince Albert sold at 2½@3⅛c. during the week, and was in demand. Vindicator sold at $1.94@$1.07, and was quite strong. The annual meeting was held this week. The preferred prospect list was strong, and showed a large increase in the volume of business.

Salt Lake City. Jan. 9.

(From Our Special Correspondent.)

The gratifying upward tendency during the past week has aroused much more interest in the Exchange and orders from outside are encouraging as well as inside buying. The entire list moved up, and registered gains varying in degree. Daly-West has been leading, and climbed to $44.50 from the opening at $40.95, with 1,072 shares exchanged. Daly has been on the list of dashers, having forged ahead to $3 from an opening of $1.73, but dropped back to $1.85 before the close; 4,348 shares changed hands. California picked up some since the inactivity of the week previous, and sold 19,200 at an advance of 30c., the high being 28⅝ and low 23⅝c. Consolidated Mercur has been selling at $1.76@$1.72. Grand Central, of Tintic, advanced to $6, with 1,200 shares called out. This was an advance of $2 per share over last quotation. The Exchange closed on 167,640 shares that sold for $159,251.

San Francisco. Jan. 10.

(From Our Special Correspondent.)

Speculation has been strong and active. Brokers are opening their eyes at the amount of business and the jumping in prices. Caledonia and Overman were pushed up; the former broke suddenly on Wednesday, but recovered later. Best & Belcher and Union moved up rapidly under buying orders.

The present movement is in large part a mystery to the old hands. It is even reported that an Eastern syndicate is manipulating the market. Plenty of money and a speculative disposition seem to furnish sufficient explanation.

On the Stock and Oil Exchange trading was better and prices generally firm. San Joaquin sold at $8; Home, $2.05@$3.10; Sterling, $1.90@$2; Twenty-eight, $1.60; Wolverine, 50c.; California Standard, 16c.; Lion, 7c.; Independence, 6@7c. There was active trading in the prospects.

London. Jan. 5.

(From Our Special Correspondent.)

The mining market was very quiet during the Christmas holidays, but during the last two or three days there has been considerable activity in the South African market. The center of speculation has been the shares in the Coronation Syndicate, which was recently formed to acquire large tracts of land in the far eastern portion of the Rand. The shares are nominally £100 each, but the market valuation for some time has been nearer £700. Yesterday the quotation was bid up to £2,000, and talked up to £10,000. With prices at these levels it is obvious that the market is restricted, and it is possible that the dealers get no actual bids. Anyway, it is only a millionaire's game, and is out of reach of the ordinary speculator.

The West Australian mining market has received another nasty blow this week by the discovery of the existence of forged certificates of Great Fingalls. So far as is known the number of these is limited, but shareholders are naturally somewhat nervous. The culprit in the case is Mr. A. S. Rowe, the secretary, and his offence is to have issued false certificates for large blocks of shares and raised money on them, on loan, not by sale or transfer. The total amount raised in this way is over £50,000, and may even exceed it. So far as I can ascertain, the losers are brokers and bankers, who have advanced the money, and it is not likely any shareholders are in possession of forged certificates. The company is investigating the register in order to be quite certain of the position, but in the meantime the directors have considered it best to hold back the dividend recently announced in case they are liable for any losses. The worst of the whole matter is that Mr. Rowe is a partner in the firm of Bewick, Moreing & Co., the managers of the mine and company, and he has obviously placed the firm in an extremely unpleasant position. It is only a few months ago that I mentioned in this column that the firm had taken over the management of several West Australian properties, and were making every endeavor to rescue the market bad repute into which it had fallen on account of the wilful mismanagement of preceding controllers. Mr. Rowe had been in the employ of the firm for many years as an accountant, and was recently admitted a partner along with a fellow accountant and secretary. At the same time Mr. T. B. Bewick and Mr. Edward Hooper left the firm, and Mr. H. C. Hooper joined, Mr. Algernon Moreing being, of course, the head. At the time it was felt by most people here that the admission of accountants to partnership in a firm of consulting mining engineers and mine managers was a doubtful policy, as far as professional practice was concerned, but that is not the question at present. The event has had the effect of depressing all West Australians, and it will be some time before they revive. The latest statement is that the loss will be made good by the firm.

The Utah Consolidated Gold Mines, Limited, is about to be transferred to an American Company, said to be under the control of the Copper Trust. The company was originally formed in 1896 to acquire the shares of the Highland Boy Gold Mining Company, an American corporation owning the mine of that name in Salt Lake County, Utah. The company was introduced in London by Mr. Sam Newhouse and Mr. Reginald Ward, who disposed of large numbers of shares among society people. Some time after the mine was started as a gold proposition, it was found that at depth the pyrites contained valuable percentages of copper, and the mode of treatment was altered accordingly. When the copper trust was formed the Utah went in with it, and the Lewisohns supplied further capital. For the last 18 months the International Trust Company, of Boston, has been buying shares in the open market, and now owns over three-quarters of the whole. It is, therefore, only natural that the headquarters should be removed to America. Probably the remaining English shareholders will have the opportunity offered for parting with their holdings.

The history of the other Utah property introduced in London by Messrs. Newhouse and Ward has not been so encouraging as that above mentioned. I refer to the Boston Consolidated Copper and Gold Mining Company. This company, as your readers already

know, owns very extensive ore deposits, whose copper and gold contents are too low to pay to extract by any ordinary process. In the report just published it is stated that there are millions of tons in sight, of which over 600,000 tons contain more than 3 per cent copper, and that the more recent developments show an increase in the average contents. The directors have not, however, yet agreed on any process of treatment, and the shareholders are obliged to defer once more their hopes of gain. It is hardly necessary to mention that there is no American syndicate buying up the shares.

The British Ore Concentration Syndicate, which owns the English patents of the Elmore process for concentrating with oil, has issued its first report. From this it appears that the syndicate has granted licenses and supplied plant to the St. Davids mines in Wales, and the Tywarnhaile Mine in Cornwall. The chief direct work has, however, been devoted to the development of the process at the Sygun Mine in Carnarvon, where Mr. Edward Skewes has charge of affairs. The mine has been extensively developed, and preparations are being made for the immediate treatment of 100 tons per 24 hours. A 20-stamp battery has been erected, with four units of oil plant. At the present time only one shift of eight hours is being worked, but continuous work will start shortly. The subject is being very thoroughly investigated at this mine, and the results can be accepted as a practical demonstration of the value of the process.

COAL TRADE REVIEW

ANTHRACITE.

New York, Jan. 15.

Cold weather is accentuating the shortage of anthracite and causing the public much inconvenience and considerable distress. The large producing companies and the railroads are doing the best they can to relieve the demand, while the independent operators, selling their coal for what may be called the market price are making money and recouping themselves for losses due to the strike. It is worthy of note, however, and the fact seems to escape the attention of the daily press, that there is distress and suffering at points in Indiana, Illinois and Kansas, where anthracite is never anything more than a luxury for the well-to-do. The great strike last year is not responsible for the present fuel shortage at such points, and the anthracite operators have reason to feel that many newspapers prefer ignorant vituperation to calm presentation of facts. The supply of fuel in the greater part of the United States to-day rests not with the mine operators, but with the railroads. It is probably fair to say that had the anthracite miners stuck to their work all last year coal would have been scarce at many points this winter. To-day at seaboard points soft coal is selling at higher prices than hard. Congress may appoint investigating committees and politicians may play to the gallery, but the fact will remain that railroad equipment or management has not met the country's needs, and it is doubtful if railroad officials could be expected to foresee such traffic conditions as prevail at present.

The demand for anthracite is strenuous and widespread. The newspapers at great cities howl about local shortages, ignoring the needs of communities where shortages may be even more acute, and ignoring or misquoting the statements of operators. The daily output of the mines, though probably the largest recorded, is more than covered by orders from all points. At the head of the lakes anthracite is almost out of the market. What little has arrived by all-rail is altogether insufficient to affect the demand. Soft coal and wood are in great demand. In Chicago territory the anthracite situation is worse than a week ago, with little prospect of much relief for some time, as all-rail receipts are below normal. Coal produced by the large companies is selling for $7, and independent coal for $11.

Along the lower lakes and in Canada the demand for anthracite far exceeds the supply available. Buffalo is reported to be still better off than any other city in this territory. Railroad coal is selling there for $6, f. o. b., and independent coal for as high as $10. In the all-rail trade farther east and along the Atlantic seaboard cold weather is causing distress, and the situation is not helped by the clamor of sensational newspapers. New York railroad coal is selling for $5, f. o. b., and independent coal at $10. The demand is heavy, and sales agents are unable to help things. Cold weather and sensational journalism make buyers nervous, and give independent producers and many dealers an opportunity to make unwarranted profits.

BITUMINOUS.

Demand in the Atlantic seaboard bituminous trade has eased a little during the week. Coal ordered in England is now beginning to arrive, and the total tonnage ordered, though not large, is large enough to affect the market. The railroads have also curbed speculative prices somewhat by embargoing car supply at the mines to some shippers, who have had coal standing at tidewater for days, thus forcing what coal was held in cars on the market. The current range for speculative coal is $6.90@$7, f. o. b. New York Harbor shipping ports, for Clearfield grades, and the impression in the trade is that unless something unforeseen occurs prices will go lower. The railroad situation is unchanged. Last week car supply at the mines was comparatively good, but this week it has fallen off again, and has fluctuated between 25 and 50 per cent of the demand. The movement of coal at loading and receiving ports is somewhat hindered by ice around the docks.

Trade in the far East is comparatively easy. The principal shipments from abroad are for that territory, and enough foreign coal has arrived to quiet the demand. As showing the situation, a man offering coal in that market was told that the firm he was dealing with had too much foreign coal to take care of to consider domestic shipments. Along Long Island Sound consumers are taking considerable speculative coal, but are rather holding off, evidently expecting lower prices, and are buying only when obliged. At New York Harbor the trade is comparatively quiet, and everybody is looking for an easier market. The all-rail trade is still short of coal, but there seems to be a combined effort of producers and shippers to some points to help out the situation.

Car supply at the mines averages about a third of the demand. Transportation from the mines to tidewater takes about a week. In the coastwise vessel market there are now, apparently, vessels enough to supply needs. Crafts of 1,000 tons or over are having trouble in getting charters, and are offering less than the current rates. We quote current rates as follows: From Philadelphia to Boston, $1.90@$2; to Long Island Sound ports and Narragansett Bay, $1.25; from New York Harbor to Boston, $2; to Providence, New Bedford and Long Island Sound, $1.15, with barge rates to New York Harbor points, 40c.

Birmingham. Jan. 12.

(From Our Special Correspondent.)

During the past week the State Mining Board examined a big class, more than 40, for mine foreman certificates. More than half the number standing the examination were successful and have license now to practice as foremen.

A preliminary report made by the Chief Mine Inspector of Alabama to the Governor places the output at the coal mines during 1902 at 9,700,000 tons, with a possibility of it going over 10,000,000 tons. The record as to fatal accidents in the mines during the past year shows that 51 men lost their lives in the mines, 24 of them colored and 27 white. Nine of the accidents were from explosions of powder or dynamite, and showed gross carelessness.

Statements are made that soft coal from this section is now finding its way both north and west. The shortage of fuel in the West will have some effect hereabouts, while the Southern trade will look this way to a larger extent now than ever before. Reports from Louisiana and other points to the effect that fuel oil is not so plentiful is encouraging to the coal trade in this section, and the Mississippi River shipments promise to increase right along.

Cleveland. Jan. 13.

(From Our Special Correspondent.)

The factories of Cleveland have not as yet been affected by what appears to be a coal shortage here. Such a report has been frequently spread, but as far as can be learned the seeming shortage occurs only in the purely domestic trade, for which the nervousness of the people in general is largely to blame. The apprehension is and has been that coal is to be disastrously scarce, and purchases are being made greatly in excess of possible immediate needs. Along with the actual want there is a desire created by a panicky condition. The best opinion is that by a careful distribution of the coal there would be more than is actually needed for the present winter. The manufacturing concerns report that they have the usual supply on hand, and have been getting consignments of steam coal with due regularity, and, in fact, with better results than is usually given them. On the other hand, the retail dealers have made the statement that Cleveland, for domestic purposes, has not to exceed three days' supply. This is conducive to high prices.

In the lake trade there is not such an encouraging situation. The ports in the upper lake region report an actual shortage of coal, and are making strenuous efforts to get in their full proportion by an all-rail movement. This movement, however, has not been taken under serious consideration, and there is a question whether the railroads will make the desired concession on the tariffs. The question of prices for next year is being influenced by this situation as well as is the question of lake rates of transportation. During the week the Pittsburg Coal Company took over the National Dock and Fuel Company, a $3,000,000 transaction, which gives the absorbing company practically a monopoly of the lake fuel situation.

Pittsburg. Jan. 14.

(From Our Special Correspondent.)

Coal.—It is impossible to quote prices for coal, the only question now being of delivery. Producing companies have difficulty in filling contracts, and are forced to reject offers of fancy prices. Some sales have been made by independent companies during the week at $5 and $6 a ton for run-of-mine coal. Navigation has been closed for the present, but last week the Monongahela River Consolidated Coal and Coke Company sent about 4,000,000 bush. to the lower markets. Some Pittsburg coal, it is reported, has been sold at New Orleans for shipment by ocean steamers to Boston. The annual district convention of the United Mine Workers opened here yesterday. A report of the delegates showed that nearly all had been instructed to vote for an advance of 20 per cent, and the delegates to the national convention which will be held in Indianapolis next week will be instructed accordingly. A report was received at the convention to-day from Columbus where the Ohio miners are holding a convention, announcing that a demand will be made by the Ohio miners for an increase of 25 per cent. The conservative leaders in this district are confident that an advance will be granted, but do not believe that it will amount to more than 10 per cent. The new wage scale will go into effect on April 1, and be effective in the four mining States of Pennsylvania, Ohio, Indiana and Illinois, which are bound by the interstate agreement.

Connellsville Coke.—Both shipments and production increased last week, and shipments yesterday were good, but to-day there is but little coke being moved, and the merchant furnaces in the Valleys have not been particularly benefited. The furnaces owned by the Steel Corporation are getting all the coke they require, but the merchant furnaces are sufferers. Premiums are still being paid for prompt shipment, but the railroads are still unable to handle the freight offered. The *Courier*, in its weekly report last week, gives the production at 237,739 tons, an increase of fully 25,000 tons over the previous week. The shipments aggregated 9,613 cars, distributed as follows: To Pittsburg and river tipples, 3,973 cars; to points west of Pittsburg, 4,202 cars; to points east of Connellsville, 1,438 cars. This was an increase of 1,243 cars.

Foreign Coal Trade. Jan. 14.

Export trade continues dull. Some British coal is still coming in at Atlantic ports, and it seems quite probable that more will be imported. From the tenor of the discussions at Washington it seems likely that the import duty on coal will be suspended for a time.

The coal production of Germany for the 11 months ending November 30 is reported as below, in metric tons:

	1901.	1902.	Changes.
Coal mined	98,970,063	97,827,672	D. 1,142,391
Brown coal (lignite)..	40,575,233	39,069,114	D. 1,506,119
Totals	139,545,296	136,896,786	D. 2,648,510
Coke made	8,434,946	8,328,793	D. 106,153
Briquettes made	8,451,827	8,370,372	D. 81,455

The reduction was in the earlier months of the year. In November there was a substantial increase in both coal and lignite.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of January 3, 1903, that owing to the recent holidays the miners are only partially resuming work, and the output is consequently limited. At the same time there is a considerable accumulation of tonnage on the docks. The general tons of the Welsh coal market is very firm, and the strong demand from America continues. Quotations are: Best Welsh steam coal, $3.72@$3.84; seconds, $3.66; thirds, $3.54; dry coals, $3.48; best Monmouthshire, $3.42@$3.48; seconds, $3.30; best small steam coal, $2.40; seconds, $2.22; other sorts, $2.04.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market is very steady, with, if anything, an improved tendency. Some rates quoted from Cardiff are: Marseilles, $1.35; Genoa, $1.50; Naples, $1.44; Singapore, $2.52; Las Palmas, $1.50; St. Vincent, $1.62; Rio Janeiro, $2.34; Santos, $2.58; Buenos Aires, $1.80.

IRON TRADE REVIEW.

New York, Jan. 14.

The iron market is gradually resuming the activity which was slightly interrupted by the turn of the year. There has been uite a demand for foundry iron in the East, which is being satisfied mainly by foreign material. Steel billets remain somewhat scarce, the absorption of the Sharon Steel Company by the United States Corporation having taken off some supplies formerly sold in the open market. The worst condition at present apparently results from delays in transportation, which have been intensified by the cold weather. Supplies of coal and coke are being delivered very irregularly, and quite a number of furnaces in the Mahoning and Shenango valleys have been obliged to bank, while several mills are reported closed down on account of the non-delivery of coke.

Birmingham. Jan. 12.

(From Our Special Correspondent.)

The pig iron market conditions in Alabama are gratifying, though on the horizon there is a ripple of probable trouble. The books are well filled with orders, and production and shipments are steady, but there is apprehension that an advance in freight rates is probable, and a meeting of the Southern Iron Committee, which is composed of the various railroads of the district, has been called for this week. The iron manufacturers in this section have written a letter to the Iron Committee protesting against any advance, and especially on iron undelivered from last year, the claim being made that the responsibility for non-delivery is with the railroads, which did not have enough equipment. A counter claim is made that the iron companies filled orders at higher prices instead of attending strictly to old orders. The meeting this week will be interesting.

There has been some selling for the latter half of the year, and representatives of Southern manufacturing companies have been in New York during the past week discussing possible conditions.

The report of the Southern Iron Committee for the month of December will be out about the first of next week. It will make the best showing of one month's business ever seen. While nothing official is to be learned, the statement is made that shipments during December will aggregate something like 190,000 tons. The shipments last January amounted to 182,208 tons, and this was the greatest movement of the year for one month. The railroads exerted themselves wonderfully last month.

The following quotat ons are given now: No. 1 foundry, $21@$22; No. 2 foundry, $20@$21; No. 3 foundry, $18.50@$19; No. 4 foundry, $17.50@$18.50; gray forge, $16; No. 1 soft, $21@$22; No. 2 soft, $20@$21.

There is considerable activity in finished iron and steel products, and the steel plant at Ensley, belonging to the Tennessee Coal, Iron and Railroad Company continues in active operation. The Republic Iron and Steel Company is importing steel from Germany, 3,000 tons of billets having been received already.

Cleveland. Jan. 13.

(From Our Special Correspondent.)

Iron Ore.—The sole interest in the lake ore trade at present is the shipment from the lake docks to the furnace stock piles, which is now quite heavy. Nothing has been done in the way of making charters for next year, as that will have to wait upon such action as is taken in the matter of ore prices which have not as yet been discussed.

Pig Iron.—The coke shortage, which continues to tie up half of the furnaces in the Valleys and to threaten a larger percentage of them, is still the most prominent feature in the pig iron market. This is shortening the supply of iron here, requiring larger shipments from the South, and thereby depriving the East, which is forced to depend upon foreign consumers. The result is disastrous to the domestic producers. The sales of foundry have been heavier for quick shipment, and for first-half delivery with some iron being sold for delivery between May and the end of the coming year. The prices which are being paid now are the same as have been paid all along, except that the market appears to be stronger than it was a week or ten days ago, all question of any lowering of the prices having been lost sight of completely. The prices quoted, therefore, are strong at $23 for first-half, Valley furnace, for No. 2 foundry, and $21 second-half for the same grade. The Southern iron is bringing $19.50@$20, Birmingham, for first-half delivery. Bessemer iron is a poor seller, just now with very little reported. The prices hold at $23 for first-half delivery, with nothing said about second-half sales. Basic producers are getting caught upon old orders, but without any new business promising any ways soon. The nominal quotation is $21, Valley furnace.

Finished Material.—The mills in the Pittsburg District have closed contracts during the past week with the Toledo, St. Louis & Western for 2,500 tons of steel rails of standard gauge for delivery during the coming year. Other rail contracts are pending which will bring the aggregate new tonnage up to 10,000 tons. The price at which this material is being placed is $28 per ton, the association price of two years standing. There is also a good call for bars just now, but the situation developing is interesting. One contract of 2,000 tons was offered during the week on bar iron, but the consumer wanted to make the price 1.70c., delivered, which the larger mills refused to do, thereby strengthening their position with the consumers generally. The bar steel prices hold firm with a good business ahead. The quotation is 1.60c., Pittsburg, for bessemer, and 1.70c., Pittsburg, for open-hearth. The sheet market is still weak. The smaller mills have been cutting under the regular prices in order to obtain business, and have succeeded in getting the greater part of what is being done. The prices, however, are nominally quoted on the old foundation of 3.10@3.25c., for No. 27, out of stock. The structural demand is good all around. The jobbers are doing a larger business; the small mills are finding an increased demand for material for quick shipment, and the larger mills are getting contracts. The prices hold at 1.60c., Pittsburg, from the larger mills; 2.25c., out of stock, and 1.75c. from the smaller mills. The plate trade is comparatively light, with, however, good specifications on old contracts. The smaller mills are getting 2c. on limited contracts, while the larger mills adhere to the old association price of 1.60c., Pittsburg.

Philadelphia. Jan. 14.

(From Our Special Correspondent.)

Pig Iron.—A high authority in pig iron circles, being asked to-day for an opinion upon the probable future of the market remarked that buyers who were holding back their orders in anticipation of weaker prices would be woefully disappointed. Two or three large consumers who would place their orders just now if they were convinced it were the right thing to do, take a very different view of the situation. They think the situation does not warrant a continuation of outside figures, and assign as a chief reason that most consumers are pretty well supplied for the next two months. There is very little buying going on at present, and it is not likely that large orders with domestic makers will be placed until consumers can exhaust their chances abroad. The importers just at present are keeping their counsel, but they intimate that importations of foreign iron are bound to increase between now and spring. Negotiations are closing every few days for considerable stocks of pig from abroad, and it looks as if the argument is in favor of the importers. Quotations have not changed for either foreign or home material for over a week.

Merchant Bar.—Merchant bar is improving in demand, both among small and large buyers. The most encouraging feature of the week was an inquiry for quite a large lot of common iron for car building purposes, which it is understood will be controlled by eastern and middle Pennsylvania mills. Nominal quotations for steel bars are 1.85c.

Sheets.—Sheet manufacturers say that if concessions which are asked for were made at this time there would be no difficulty in capturing some good business.

Pipes and Tubes.—All concerns that use pipes and tubes are simply choked up with work, and it goes without saying that the consumption of such material is kept up at the maximum point. The larger manufacturers have their prices fixed and there is no appeal from them. The smaller consumers are still put to a good deal of inconvenience by not being able to get their material when they want it.

Skelp Iron.—Skelp iron has been shaded, but still a little business is secured in Eastern mills, enough to keep up spirits and keep the mills running.

Merchant Steel.—Tool steel appears to be about the only thing that is moving in this market at present. Spring-makers are all crowded with work, but are not buyers. Eastern hardware requirements are for the time being unknown. Large consumers are eating up their steel stocks very fast. These buyers look for lower quotations, and while not exactly holding back orders feel they are not losing anything by waiting. Prices in the main are as they were a month ago.

Plates.—There is quite a little activity in tank iron, mostly ¼ in., and for small lots of boiler plate. No large orders have been heard of lately. No change in prices.

Structural Material.—A good deal of local work is now in sight in the way of office building, warehouse and factory work. Contractors in this city who take outside work are in sight of some big contracts through eastern and middle Pennsylvania.

Steel Rails.—Steel rails are $28 for standard sections. The only orders that have been booked lately are for sections running up as heavy as 90 lbs. Girder rails are quoted at $33.50, and the rail makers see quite a harvest of trolley line work ahead of them.

Oil Rails.—Holders of old rails are hanging out for prices, which buyers will not pay, excepting for small lots to piece out with.

Scrap.—All ordinary scrap is selling at unchanged prices. If low phosphorus scrap could be had it would probably bring the holder's price without question. Country scrap and railroad scrap are very scarce.

Pittsburg. Jan. 13.

(From Our Special Correspondent.)

Active buying has not begun, but there are many inquiries for iron and steel, and some large sales have been made. The outlook is brighter than it has been for several weeks. Operations of the mills and furnaces are not satisfactory, and the severe weather is likely to cripple a number of important plants in this district. Despite the fact that there is plenty of coal here not more than a week's supply is available if the rivers freeze. The railroads cannot be depended upon to relieve the situation, and the mills must look to the river coal companies for fuel. The big plants of the Carnegie Steel Company at Homestead, Braddock and Duquesne will not be affected, as fully 1,000,000 bush. of coal are constantly kept on hand, and besides the mills are equipped for the use of natural gas. Other mills are not so well provided with fuel, and will be seriously affected if the supply is curtailed or cut off from the rivers. All the available pool boats are moving in an effort to keep the streams clear. Even a brief suspension of operations of the mills would be felt, as all are filled with rush orders. There was a good shipment of coke yesterday, but reports from the Valleys to-day are to the effect that more furnaces are down than last week. But little business in pig iron is being accepted for delivery during the first half, as the furnaces are practically sold up. With the most favorable conditions it is doubtful if the contracts now on hand for first quarter delivery can be filled. The United States Steel Corporation may soon be entirely independent as to its pig iron requirements. An additional furnace of the Edgar Thomson group at Braddock, No. 11, was blown in during the week. Another of the Carrie group at Rankin soon will be ready, and work on the new furnaces at Donora acquired by the recent purchase of the Union Steel Company properties, is being rushed. A new furnace at Youngstown is expected to be ready in a few weeks. The blast furnace at Sharon, which was included in the Union deal, also is producing iron for the big corporation, and the second furnace at that place will be ready to blow in probably about May 1. There is but little demand for forge and foundry iron, but prices hold up well and the market is strong.

The absorption by the Steel Corporation of the Sharon plant has curtailed the supply of crude steel for the open market, and there is a scarcity this week. The greatest sufferers are the independent sheet and tin-plate mills. Nearly all have been forced to suspend operations. Less than three months ago almost all of the independent tin-plate plants were running, while the American Tin-Plate Company was not operating more than one-half of its 255 mills. This week none of the independent mills is running, and the combine is operating a little over 200 mills. The condition in the sheet mills is about the same. High prices of steel and low prices of the finished product established by the big corporation are responsible for this situation. This does not indicate a falling off in demand, but that the capacity in these lines is greatly in excess of the requirements of the country. At the secret meetingg of the independent interests mentioned in last week's letter, it has just developed, a plan was proposed to form a combination of all outside mills, buy ore and coking coal lands, build ovens, blast furnaces and a big steel plant. A committee was appointed to investigate and make a report at a future meeting. It is hinted that the proposition is merely a scheme to invite the United States Steel Corporation to buy the plants. There is a rush for structural material, and despite the fact that deliveries cannot be guaranteed, fully 10,000 tons have been sold within the past ten days. The quarterly meeting of the plate pool is scheduled to be held in New York on Thursday, and an effort likely will be made to advance prices. Prompt plates are being sold at $4 to $8 a ton above the base price established by the associated manufacturers.

Pig Iron.—Bessemer pig iron is firmer, and for second quarter delivery $21.50, Valley furnace, is quoted. The price of $22 for first quarter is nominal. About 5,000 tons were sold for delivery up to August 1. Gray forge is quiet, and $21.25, Pittsburg, is quoted. A good demand is expected, as consumers have not bought ahead in anticipation of a decline. Foundry No. 2 also is quiet. For first-half delivery, $22.50@$23, Pittsburg, is quoted.

Steel.—Bessemer steel billets are firm at $30, Pittsburg, and open-hearth bring $1 more. A sale of 15,000 tons of open-hearth billets at $31 was announced yesterday. About 10,000 tons of steel plates were sold during the week for future delivery. The base price is 1.60c., but from $4 to $8 a ton over that rate is offered for prompt shipment. Steel bars are selling at 1.60c.

Sheets.—Transactions in sheets are light, considerable heavy buying having been done for first-half delivery. No. 28 gauge black sheets continue to be quoted at 2.75c., and galvanized at 75, 10 and 5 per cent off.

Ferro-manganese.—Domestic 80 per cent is still out of the market, and the price of the foreign product ranges from $50 to $51.50.

New York Jan. 15.

Pig Iron.—The market continues rather quiet, with buying limited to current needs. We quote for 1903 delivery, Northern irons at tidewater: No. 1X foundry, $24.25@$25; No. 2X, $22.75@$23.25; No. 2 plain, $21.50@$22. For Southern iron on dock, New York, No. 1 foundry, $24.50@$25.25; No. 2, $23.75; No. 3, $22.50. Middlesboro No. 3 pig is quoted at $18.50, in large lots, but for small lots and spot delivery, $20 is obtained.

Bar Iron and Steel.—We quote for large lots on

dock: Refined bars, 2@2.05c.; common, 1.90@1.95c.; soft steel bars, 2@2.10c.

Plates.—Demand is fairly good for so early in the year. We quote for tidewater delivery in car-loads: Tank, ¼-in. and heavier, 2.09@2.15c.; flange, 2.24@2.30c.; marine, 2.34@2.40c.; universal, 2.05@2.15c.

Structural Material.—Few new orders are noted. We quote for large lots at tidewater: Beams, angles, channels and tees, 1.75@2c. For small lots and prompt delivery premiums are paid.

Steel Rails.—Standard sections are still quoted at $28, f. o. b. mills for 1903 delivery; light rails, $30@$36, according to weight. Relaying rails are $28@$30 for heavy sections and $33@$35 for light sections.

Cartagena, Spain. Dec. 27.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—Shipments from Carthagena for the week included 2,300 tons of dry ore and 9,840 tons of manganiferous ores. This makes a total of 255,500 tons for the year. Owing to the holidays very little business has been reported, but the general tone is good with a large demand. Shippers, however, are somewhat disappointed at the small demand for ore from the United States. Freight rates are very low, and offer inducement for speculation in odd cargoes.

Prices are firm at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. for lump and 9s. 3d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 11s. 3d. per ton. Exports of pyrites for the week were 650 tons to Milazzo. Other exports include 10 tons ocker to Liverpool.

CHEMICALS AND MINERALS.

(See also wholesale price list on page 140.)

New York, Jan. 14.

Trouble is being experienced with transportation, as railroads are busy handling an increased quantity of freight. Consequently, the chemical trade has quieted down, and consumers who anticipated this difficulty are satisfying their wants from stocks on hand.

There has been quite a little export trade in heavy chemicals with the West Indies and South America. Small lots of talc have also been sent to France; calcium carbide to Sydney, Nova Scotia and zinc ashes, dross and skimmings to Great Britain.

Import trade is normal, and includes 106,400 lbs. cyanide of potash from Great Britain.

New companies are more numerous, and among them may be noted the United States Carbonic Acid and Equipment Company, at Camden, N. J., capitalized at $4,500,000, to manufacture carbonic acid gas, etc. This industry is receiving increased attention in this country, and where one or two large concerns were formerly in control there are now a number making carbonic acid gas for the preparation of artificial mineral water. Eastern people have also formed the Union Talc Company, at Augusta, Maine, with a capital of $1,000,000. The production of talc is steadily increasing, notwithstanding the heavy imports from France and Italy. Paper manufacturers consume the larger part of the supplies.

Heavy Chemicals.—Generally quiet. Prices little changed.

	Domestic. Prompt.	F. o. b. works. Futures.	Foreign. Prompt.	F. o. b. New York. Futures.
Alkali, high-test per 100 lbs.	82½@85c.	72½@75c.	90@92½c.	.....
Caustic soda, high-test	$1.90@$1.95	$1.65@$1.70	$1.90@$2.00	.....
Bicarb. soda, ord.	$1.25	.....	$1.50@$1.60	.....
Bicarb. soda, extra	$3.00	.....	.....	.....
Sal soda	90c.	.....	67½c.	.....
Chlorate of potash	$7⅝@$7⅝	$7@$7¼	$7½@$8	$7@$7¼
Bleaching powder	.....	$1@$1.15	$1.37½@$1.62½	$1.12½@$1.25

White Lead.—Firm, owing to increased expense in corroding consequent upon dear fuel. White lead prices on contracts are higher than last year. One large consumer—the Trenton Potteries Company, the New Jersey pottery combination—has contracted for this year's supply of old process white lead at 4¾c. per lb., against 4¼c., less 2 per cent in 1902. New or quick process pigment is fractionally less.

Acids.—Large consumers of muriatic and sulphuric acid have placed their contracts for this year on basis of quotations, certain orders, of course, receiving lower prices. Blue vitriol has stiffened as imports have been interfered with by higher prices abroad. Sales for delivery to July 1 are reported at $4⅛@$4.30 per 100 lbs., but to-day sellers quote up to $4.50. Higher prices are anticipated.

Quotations per 100 lbs. are as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars) delivered in New York and vicinity:

Blue Vitriol	$4.30@$4.50	Oxalic com'l	$5.25@$5.50
Muriatic, 18°	1.50	Sulphuric, 50°,	
Muriatic, 20°	1.60	bulk, ton	13.50@15.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	Sulphuric, 60°,	
Nitric, 38°	4.75	bulk	18.00@20.00
Nitric, 40°	5.00	Sulphuric, 66°,	1.20
Nitric, 42°	5.37½	bulk	21.00@23.00

Brimstone.—Business is uninteresting. Steamers in port bring $23.50 per long ton for best unmixed seconds, while futures are quoted at $22.50@$22.75. Best thirds are from $1.75@$2 per ton less than seconds.

Pyrites.—Demand is good, and importers are unloading fully 20,000 tons. There are also some 40,000 tons afloat, and the calculation is that this will be a prosperous year.

Ocean freight rates from Spain have been strengthened by the heavy movement in iron and coal for American account. Some of the pyrites shipments now being made are on a 10s. 6d. ($2.52) per ton basis, but new charters will likely pay up to 12s. 6d. ($3). This latter rate is the highest in over a year, and is 2s. 9d. (66c.) above the quotation in January, 1902. Prices for pyrites are also expected to advance, as it seems difficult to obtain a sufficient supply or good ore. Importers differ in their quotations; those who hold long time contracts are bullish, while others who are in the market are willing to entertain lower prices. Domestic producers continue to report unchanged prices, as their output is well contracted for.

Quotations for pyrites are f. o. b. Mineral City, Va.: Lump ore, $5 per ton, and fines 10c. per unit; Charlemont, Mass., lump, $5, and fines, $4.75. Spanish pyrites, lump, 12½@13½c.; fines, 10½@11½c. per unit, New York and other Atlantic ports. Spanish pyrites contain from 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Nitrate of Soda.—The market continues firm, owing to the labor troubles at Tocopilla, Chile. Spot nitrate of soda brings $2@$2.02 per 100 lbs., early shipments, $1.87½@$1.87½, and distant futures, $1.85. The British bark *Sardhana* has been chartered at 16s. 3d. ($3.90) to carry 13,000 bags to Hampton Roads for orders. This rate is somewhat higher than has been recently taken, and as the boat is due in the United States in April, it is expected to influence the future freight market. The steamer *Condor* with 22,800 bags is due to-day, January 14, and the *Longships*, with 42,450 bags, Saturday, January 17. A number of other cargoes are due this month, while 8 are scheduled for February.

In their nitrate of soda report Messrs. W. Montgomery & Co., of London, give the following interesting statistics, in long tons:

	1901.	1902.	Changes.
So. Am. shipments	1,238,000	1,351,000	I. 113,000
Consumption, Great Britain	118,000	111,000	D. 7,000
Consumption, Continent	1,036,000	917,000	D. 119,000
Total, Europe	1,154,000	1,028,000	D. 126,000
Consumption, U. S.	192,000	220,000	I. 28,000
Consumption, other countries	18,000	17,000	D. 1,000
Total, world	1,364,000	1,265,000	D. 99,000
Vis. supply, Eu'pe, Dec. 31	617,000	660,000	I. 43,000

The world's consumption in 1902 shows a decrease of 7.2 per cent, due principally to the smaller demand from the beet sugar growers on the Continent. The deliveries in the United States have increased about 15 per cent.

Prices advanced 1½d.@3d. (3@6c.) per cwt. during the summer, and with the improvement in beet sugar in the autumn, the market strengthened. Coupled with a scarcity of nitrate in Chile from September to December prices have slowly hardened, closing extremely firm at 9s. 3d.@9s. 4½d. ($2.22@$2.25) per cwt. for spring arrival with very few floating cargoes to be had.

The producers' combination fixed the quota for the year ending March 31, 1903, at 1,375,000 tons, and this the producers are experiencing great difficulty in furnishing, the probability being that not more than 1,325,000 tons will be achieved.

Sulphate of Ammonia.—Shipments are firmer at $3.10 per 100 lbs., but second-hands will quote less. Domestic gas liquor is being bought at $3.05.

Phosphates.—Tennessee rock is firmer, owing to heavy shipments and light production. At Parsons, Tenn., the Beech River Phosphate Company is now working steadily on its new mines, and will later increase its shipments by marketing a specially prepared high-grade rock for export. In Florida mining is good, and shipments on contracts satisfactory. The new Greenhead plant in Polk County, Fla., having an annual capacity of 150,000 tons, is now at work. The company is said to have a deposit of land pebble containing 4,000,000 tons of 75 per cent B. P. L., and only 2 per cent iron and alumina. In Alachua County, Fla., the industry is fading, and the Royal Company, formerly one of the richest properties, stopped mining recently, as its deposits have been worked out.

Exports of Florida high-grade phosphate rock from the two leading ports—Fernandina and Savannah—in 1902 were as below, comparison being made with 1901, in long tons:

	1901.	1902.	Changes.
Fernandina	181,569	186,105	I. 4,536
Savannah	163,438	185,778	I. 22,340
Total tons	345,007	371,883	I. 26,876

The increase in 1902 is equal to 7.8 per cent. The bulk of these shipments was for Germany, made chiefly by Schilmann & Bene, H. F. Dutton & Co., J. Buttgenbach & Co., Ford & Hiller, and the Dunnellon Phosphate Company.

Concerning the phosphate industry in South Carolina in the fiscal year ended November 30, 1902, the State inspector reports as follows, comparison being made with the previous fiscal year:

	1901.	1902.	Changes.
Rock mined	82,656	82,119	D. 547
Rock shipped	90,740	100,502	I. 9,762
Stocks, Nov. 30	61,845	37,913	D. 23,932

This statement shows a small decrease in production, an increase of 10.7 per cent in shipments, and a corresponding decrease of 36.5 per cent in stocks on November 30, 1902. Of the shipments 66,796 tons were foreign, and 33,706 tons coastwise, The five companies reporting were the Coosaw, Central, Beaufort, Empire and Stono. Commenting on the industry the inspector says: "The phosphate mines have had to contend with an adverse market for their rock; only in one instance has the price exceeded $3 per ton, the Coosaw Company being the only company to pay additional royalty—$187.65. A large per cent of the rock was shipped to foreign markets. The Central and Beaufort companies each operated two dredges continuously during the year in Coosaw River. Both made application for a renewal of their licenses, which was granted them. The Coosaw Company operated two dredges in Coosaw River until it suspended mining in April last. It still has 500 tons of rock on hand. The Empire Mining Company, when in operation, uses only hand pickers in the spring and summer months. It has on hand 8,100 tons of rock. The New Cut Mining Company still reports 600 tons of rock on hand. This company suspended business about two years ago. The rock on hand has never been kiln-dried, and there is trouble in finding a favorable market for it. The Stono Company worked one dredge continuously in Stono River until November, when it suspended for repairs and other improvements. It anticipates being ready for work during the present month, possibly with an additional dredge. The Charleston (S. C.) Mining and Manufacturing Company has recently been granted license to mine in Coosaw River."

The fertilizer trade of Charleston is growing rapidly, and a preliminary estimate of this season's shipments puts the total at 400,000 tons, an increase of about 20 per cent, and the largest quantity on record.

The Virginia-Carolina Chemical Company's plant on the James River, east of Richmond, Va., was recently burned. Besides the special machinery for making acids, there were 4,000 tons of fertilizer and 12,000 tons of unmixed material.

Abroad the phosphate trade is seasonably quiet. Mining, however, continues active. In Algeria the Rhiras deposits, owned by L. Chateau, have been consolidated with the Tocqueville Phosphate Company. Both properties are now being worked by the Union des Phosphates de Tocqueville et des Rhiras, of Paris, France.

Phosphates.	Per ton F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (78@80%)	$6.00@$6.50	6@6⅝d.	$9.48@10.07
*Fla. land peb. (68@73%)	3.00@ 3.25	4⅝@5d.	6.65@ 7.00
†Tenn., (78@82%) export	3.25@ 3.50	5⅛@6d.	8.58@ 9.86
†Tenn., 78% domestic	3.00 ...	.....	.....
†Tenn., 75% domestic	2.75@ 3.00	.....	.....
†Tenn., 73@74% domestic	2.30@ 2.40	.....	.....
†Tenn., 70@72% domestic	2.10@ 2.25	.....	.....
‡So. Car. land rock	...@ 3.25	4⅛@4⅝d.	5.67@ 5.98
‡So. Car. river rock	2.75@ 3.00	.....	.....
Algerian (63@68%)	.....	4⅝@4⅞d.	6.18@6.34
Algerian (58@63%)	.....	4⅛@4⅜d.	5.40@5.55
Algerian (53@58%)	.....	4⅝@4⅛d.	4.90@5.04

*Fernandina, Brunswick or Savannah.
†Mt. Pleasant. ‡On vessels, Ashley River.

METAL MARKET.

New York, Jan. 14.

Gold and Silver Exports and Imports.

At all United States Ports in November and Year.

Metal	November. 1901.	November. 1902.	Year. 1901.	Year. 1902.
Gold:				
Exports....	$16,292,500	$714,915	$53,039,816	$33,172,063
Imports....	7,431,678	3,836,307	51,970,358	39,861,245
Excess.	E. $8,860,822	I. $3,121,392	E. $1,069,458	I. $6,689,182
Silver:				
Exports....	$4,689,301	$3,764,674	$50,914,919	$43,727,779
Imports....	2,796,532	2,199,353	28,358,192	23,701,933
Excess.	E. $1,892,7	$1,565,321	E. $22,556,727	E. $20,025,846

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending January 14, and for years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week ...	$300	$422	$144 320	$11,223	E. $132,975
1903.....	18,200	535,072	602,510	50,857	E. 34,781
1902.....	1,294,300	37 861	1,722,134	84,914	E. 2 893,659
1901.....	1,685,612	204,389	1,572,143	208,840	E. 2 844,526

Gold exports were to the West Indies; imports from South America and the West Indies. Silver exports were to London; imports from Central America and the West Indies.

Financial Notes of the Week.

Business generally is comparatively quiet. The coal troubles in various sections of the country operate as a disturbing element of considerable importance.

There is some probability of gold exports, in view of a number of heavy payments, which must be made abroad before long. The lower rates of interest here will also have an effect on such exports.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending January 10, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts .	$808,032,400	$864,236,800	$871,642,100
Deposits	885,336,200	926,982,600	873,609,600
Circulation	30,970,900	32,013,700	45,639,100
Specie	173,157,500	168,222,700	156,549,000
Legal tenders	70,574,600	76,481,400	76,663,700
Total reserve	$243,732,100	$244,704,100	$233,212,700
Legal requirements ..	221,334,050	231,745,650	218,402,400
Balance surplus ...	$22,398,050	$12,958,450	$14,810,300

Changes for the week were increases of $494.600 in deposits, $1,550,300 in specie, $3,189,800 in legal tenders, and $4,616,450 in surplus reserve; decreases of $3,710,000 in loans and discounts, and $66,100 in circulation.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings on the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd.	$168,222,700	.....	$156,549,000	.....
England ...	168,126,365	.....	153,536,320	.....
France	488,562,530	$219,078,000	502,506,435	$219,324,810
Germany ...	164,790,000	60,950,000	158,560,000	58,715,000
Spain	70,120,000	89,125,000	71,925,000	98,475,000
Neth'l'ds ..	28,710,000	31,456,000	23,493,000	32,991,000
Belgium ...	15,886,665	7,943,335	14,983,335	7,491,665
Italy	80,500,000	10,312,500	84,345,000	10,411,000
Russia	348,670,000	32,790,000	382,865,000	34,065,000

The returns of the Associated Banks of New York are of date January 10, and the others January 9, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

No new features of interest have developed in the silver market. Prices have been fairly steady, and distribution of silver has gone on in the usual way.

The United States Assay Office in New York reports receipts of 49,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to January 1, are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£7,600,410	£6,367,450	D. £1,232,960
China	842,857	203,800	D. 639,037
The Straits	647,412	1,102,170	I. 454,758
Totals	£9,090,679	£7,673,420	D. £1,417,259

Receipts for the week, this year, were £325,000 in bar silver from New York, and £37,000 from Australia; total, £362,000. Shipments were £240,700 in bar silver to Bombay, £12,650 to Colombo, and £5,000 to Madras; total, £258,350.

Indian exchange continues strong, and all the Council bills offered in London were taken at an average of 16.03d. per rupee. Buying of silver has not been heavy enough to affect the demand for bills.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	$.38¼	$.39¼
Peruvian soles and Chilean pesos	.37	.39
Victoria sovereigns.....	4.85	4.88
Twenty francs.....	3.85	3.88
Twenty marks.....	4.74	4.80
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

January.	Sterling Exchange	Silver— N. Y. Cts.	London, Pence.	Copper— Lake, Cts. per lb.	Electrolytic, Cts. per lb.	London, £ per ton.	Tin, Cts. per lb.	Lead Cts. per lb.	Spelter— N. Y. Cts. per lb.	S. L. Cts. per lb.
8	4.86½	4½	22¼ @ 12¼	12¼@12⅜ 12¼	12⅛@12½ 12¼	53½	27¼	4.05 @4.10 4.05	4.70	4.50
9	4.86½	47⅞	22⅛ @ 12⅛	12¼@12⅜ 12¼	12⅛@12½ 12	53	28	4.05 @4.10 4.05	4.75	4.60
10	4.86½	48½	22¼ @ 12⅜	12¼@12⅜ 12¼	12⅛@12½ 12	....	28	4.05 @4.10 4.05	4.85	4.65
12	4.86½	48	22⅞ @ 12⅜	12¼@12⅜ 12¼	12⅛@12½ 12	53½	28¼	4.05 @4.10 4.05	4.87	4.70
13	4.86¼	47½	22 @ 12⅛	12¼@12⅜ 12¼	12⅛@ 12½ 12	53⅜	28⅛	4.05 @4.10 4.05	4.92½	4.75
14	4.86¼	47¾	22⅛ @ 12¾	12¼@12⅜ 12¼	12⅛@12½ 12	52¼	28	4.05 @4.10 4.05	4.92½	4.75

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures.

Copper.—Although somewhat quieter in tone, the market has ruled very firm indeed throughout the week, values being well maintained. Nothing of special interest has transpired, and quotations are unchanged at 12¼@12⅜c. for Lake; 12@12⅛c. for electrolytic copper in ingots, cakes and wirebars; 11¾@11⅞c. in cathodes; casting copper, 12c.

The market for standard copper in London, which closed last week at £53, opened on Monday at £53 12s. 6d., but later on experienced a decline, and the closing quotations on Wednesday are cabled as £52 15s. @£52 17s. 6d. for spot, £53@£53 2s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £56 10s.@£57; best selected, £58@£58 10s.; strong sheets, £69 10s.@£70; India sheets, £71@£71 10s.; yellow metal, 6¼@6½d.

Exports of copper from Atlantic ports in the week ending January 14, are reported by our special correspondent as follows: Great Britain, 289 long tons; Germany, 599; Holland, 1,046; France, 809; Austria, 20; Belgium, 45; Sweden, 10; Italy, 148; Argentina, 3; Panama, 51;; total, 3,030 tons. Also 56 tons matte to Great Britain—the first lot in a long while. Imports were 357 tons copper from Great Britain.

Tin.—A very large business has again been done, both for spot and future deliveries, consumption being very heavy. The quotations declined last Thursday to 27¾c., advanced on Monday to 28¼c., but have since been somewhat easier, the market closing at 28c. for both spot and futures.

The foreign market, which closed last Thursday at £123 5s., advanced on Friday to £125 10s., and on Monday to £127 10s. The closing quotations on Wednesday are cabled as £127@£127 2s. 6d. for spot, £127 10s.@£127 12s. 6d. for three months.

Lead is quiet and unchanged. The ruling quotations are 3.95@4.05c., St. Louis; 4.05@4.10c., New York.

The foreign market is steady, Spanish lead being quoted at £11 3s. 9d.@£11 5s.; English lead, 2s. 6d. higher.

Spanish Lead Market.—Messrs. Barrington & Holt report from Carthagena, Spain, under date of December 27, that the price of silver has been 12 reales per ounce; exchange has gone up 23 centimos, making it 33.90 pesetas to £1. Local quotations for pig lead on wharf have been 58 reales per quintal, which on above exchange is equivalent to £9 12s. per long ton, f. o. b. shipping port. Exports of pig lead have been 519,567 kgs. to Marseilles, and 497,498 kgs. to London; a total of 817,065 kgs. for the week.

Spelter.—The firmer tendency reported last week has made further progress, and the market has developed considerable strength. While there has been a large inquiry on the part of consumers, producers have been very reluctant sellers, not being inclined to meet present prices. Quotations have consequently advanced by leaps and bounds, and at the close we quote 4.75c., St. Louis; 4.92½c., New York.

The foreign market is also very firm indeed, good ordinaries being quoted at £20; specials, £20 5s.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of December 27, that prices for zinc ore are firm, and there is much competition to secure the ore. Shipments for the week have included 10,295 tons of blende and 900 tons of calamine, all to Antwerp.

Antimony is dull, without any special feature. We quote Cookson's at 8¼@8½c.;; Hallett's, 7@7½c.; Hungarian, Italian, U. S., French, Japanese, at 6¾@6⅞c.

Nickel.—The price is now quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quality, runs as high as 60c. per lb.

This week there was an importation at New York of 2,395 tons nickel ore from New Caledonia.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 72½c. per grain.

Quicksilver.—Prices continue unchanged. The New York quotation is $48 per flask for large lots, with a slightly higher price asked for smaller quantities. The London quotation is £8 15s. per flask, with the same figure named from second hands. In San Francisco, prices continue at $45.50@$46.50 per flask for domestic orders, while for export $43.50@$44 is quoted.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum.	Per lb.
No. 1, 99% ingots	33@37c.
No. 2, 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@22c.
Nickel-alum	33@39c.
Bismuth	$1.50
Chromium, pure (N.Y.)	80c.
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanum (20@25%, N. Y.)	55c.

	Per lb.
Ferro-Tungsten (87%)	23c.
Magnesium	$2.75
Manganese, pure (N.Y.)	60c.
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (80% Mn)	35c.
Molybdenum (Best)	$1.63
Phosphorus	45c.
American	70c.
Sodium metal	50c.
Tungsten (Best)	63c.

Average Prices of Metals per lb., New York.

Month.	Tin. 1902.	Tin. 1901.	Lead. 1902.	Lead. 1901.	Spelter. 1902.	Spelter. 1901.
January	28.54	26.51	4.000	4.350	4.27	4.13
February	24.07	26.68	4.075	4.350	4.15	4.01
March	26.32	26.03	4.075	4.350	4.28	3.91
April	27.77	25.93	4.075	4.350	4.37	3.98
May	29.85	27.12	4.075	4.350	4.47	4.04
June	29.36	28.60	4.075	4.350	4.96	5.09
July	28.38	27.85	4.075	4.350	5.27	5.06
August	28.23	26.78	4.075	4.350	5.44	5.90
September	26.60	25.31	4.075	4.350	5.49	4.08
October	26.07	26.62	4.075	4.350	5.38	4.23
November ...	25.68	26.67	4.075	4.350	5.18	4.29
December	25.68	24.36	4.075	4.153	4.78	4.31
Year	26.79	26.54	4.069	4.334	4.84	4.02

Average Prices of Copper.

Month.	New York Electrolytic. 1902.	New York Electrolytic. 1901.	New York Lake. 1902.	New York Lake. 1901.	London Standard. 1902.	London Standard. 1901.
January	11.053	16.25	11.322	16.77	48.43	71.78
February	12.173	16.38	12.378	16.90	55.16	71.17
March	11.882	16.42	12.188	16.94	53.39	69.54
April	11.618	16.43	11.986	16.94	52.79	69.61
May	11.856	16.41	12.226	16.94	54.03	69.60
June	12,110	16.38	12.360	16.90	53.93	68.83
July	11.771	16.31	11.923	16.61	52.89	67.60
August	11.404	16.25	11.649	16.50	51.96	66.34
September	11.480	16.25	11.760	16.54	52.68	65.97
October	11.449	16.45	11.722	16.60	52.18	64.11
November	11.288	16.224	11.533	16.33	51.03	64.51
December	11.430	13.845	11.599	14.36	50.95	52.34
Year	11.626	16.117	11.887	16.53	52.46	66.79

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.	1900. London. Pence.	1900. N. Y. Cents.
January	25.62	55.56	28.97	62.82	27.80	59.30
February ...	25.41	55.09	28.13	61.06	27.40	59.76
March	25.00	54.23	27.04	60.63	27.59	59.81
April	24.84	52.72	27.80	59.29	27.41	59.59
May	23.71	51.31	27.43	59.64	27.56	59.90
June	24.17	52.36	27.42	59.57	27.81	60.42
July	24.38	52.88	26.96	58.46	28.23	61.25
August	24.23	52.52	26.94	58.37	28.13	61.14
September ..	23.88	51.52	26.95	58.26	28.85	62.63
October ...	23.40	50.57	26.62	57.59	29.58	63.68
November ..	22.70	49.07	26.12	56.64	29.06	64.04
December ..	22.21	48.03	25.46	55.10	29.68	64.14
Year	24.09	52.16	27.11	58.95	28.27	61.33

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Latest Dividend Date.	Per Share.	Total.	Total to Date.
†Alaska-Treadwell	Jan. 28	.37½	75,000	5,195,000
§American Coal	Jan. 20	1.25	75,000	1,357,500
*Gold Coin, Colo.	Jan. 25	.01	10,000	1,230,000
†Boston & Mont.	Jan. 15	2.00	300,000	27,425,000
Golden Cycle, Colo.	Jan. 25	...	15,000	71,250
Greene Con., Mex.	Feb. 2	2.00	144,000	508,000
*Homestake, So. Dak.	Jan. 25	.25	54,600	11,766,750
*Homestake, S. Dak.	Jan. 26	.25	54,600	11,766,750
Jamison, Cal.	Jan. 19	.03	11,700	74,100
Mine La Motte, Mo.	Jan. 15	.20	60,000	60,000
Montana Ore Purchasing	Jan. 30	2.00	162,000	2,808,000
*N. Y. & Hond. Rosa., C. A.	Jan. 25	.10	15,000	1,865,000
Peerless Oil, Cal.	Jan. 2	.10	9,200	56,120
†Phila. Nat. Gas, com.	Feb. 2	.75	231,406	2,722,613
†Pittsburg Coal, pf.	Jan. 24	1.75	560,000	6,928,168
§Susq. Iron & Steel.	Jan. 26	.15	45,00	717,500
†Tenn. Coal, I. & R.R.pf.	Feb. 2	2.00	4,960	287,840
†Texas & Pacific Coal.	Jan. 25	1.50	30,000	2,070,000
West Shore Oil, Cal.	Jan. 2	.05	5,000	50,000

*Monthly †Quarterly. §Semi-annual.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
American, Cal.	Jan. ..		Jan. 26	.....	.02½
Best & Belcher, Nev.	Jan. ..		Jan. 30	.....	.15
Brunswick Con.	Cal. ..		Jan. 7	.....	.03
Bullion Con.	Nev. ..		Feb. 2	.....	.03
Caledonia	Nev.	52	Dec. 31	Jan. 19	.15
Challenge Con., Nev.	Feb.	35	Feb. 3	Feb. 26	.05
Christmas	Utah	10	Dec. 15	Jan. 17	.00½
Copper Range	Utah	..	Feb. 2	Feb. 20	.00½
Elise	Utah	3	Jan. 12	Jan. 30	.00½
Gould & Curry	Nev.	100	Jan. 2	Jan. 20	.10
Inyo Marble	Cal.	36	Jan. 3	Feb. 3	.06
Jubilee, Cal.	Jan. ..		Jan. 19	.....	.05
Martha Washington	Utah	2	Jan. 27	Feb. 14	.01
Mt. Pleasant Con., Cal.	Jan. ..		Jan. 31	.....	.01½
New Montezuma, Cal.	Jan. ..		Jan. 17	.....	.02
Seg. Belcher & Mides Con.	Nev.	30	Feb. 2	Feb. 24	.05
South Eureka, Cal.	Jan. ..		Jan. 22	.....	.03
South Swansea	Utah	1	Feb. 3	Feb. 21	.03
Tule Bell	Cal.	2	Jan. 15	Feb. 10	.01

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	Jan. 7. H.	Jan. 7. L.	Jan. 8. H.	Jan. 8. L.	Jan. 9. H.	Jan. 9. L.	Jan. 10. H.	Jan. 10. L.	Jan. 12. H.	Jan. 12. L.	Jan. 13. H.	Jan. 13. L.	Sales
Acacia, Colo	1			.07½										100
Alice, Mont.	25					.30								100
Amalgamated c., Mont	100	66.25	64 00	64.88	63.88	65.00	63.88	65.38	64.13	64 63	63.50	64¼	62¾	113460
*Anaconda c., Mont.	25	100	97	97	96	96		99		97½		96½		2,000
Belcher, Nev.	3							.58		.52				300
Best & Belcher, Nev.	3							3.15						200
Brunswick, Cal.	1													
Caledonia, Nev.	2½							2.75						100
Comstock T., s., Nev.	2	.06				.08	.07½	.08½				.09	.08½	13,700
Comst T. Bonds	100				.06½	.06¾	.07		.08⅞			.08½	.08	33,500
Con. Cal. & Va., g. s. Nev	2½	1.75				1.80		2.25	2.15	2.40				2,000
Confidence, Nev.	1							1.50						300
Cons. Imperial, Colo.	1					.08	.07	.08½	.08					3,700
Cripple Creek c., Colo.	1					.08½								1,000
Crown Point, Nev.	3					.32								300
Elkton g., Colo.	1	.36		.35		.38				.37		.35		3,700
Fanny Rawlings, Col.	1					.07								1,000
Gold Dollar, Colo.	1			.05½		.06								3,500
Gould & Curry, Nev.	3							.89				1.00		400
Greene Con., c., Mex.	10	24.63	23.75	24 00	23.50	24 13	23.63	24.00	23 88	23.75	23.50			5,233
Hale & Norcross, Nev.	3			.58	.57	.75						.95		1,000
Jack Pot, Colo.	1			.30				.29				.30	.29	2,600
Isabella, g., Colo.	1									.14				500
Mexican, Nev.	3	1.00										2.75		400
Mollie Gibson, Colo.	5							.07	.06½					1,000
Moon-Anchor, Colo.	5					.12		.09						800
Occidental, Nev.	1					.50								
Ophir, s., Nev.	1	1.80						2.50		2.65				400
Overman, Nev.	1					.75								100
Pharmacist, Colo.	1	.05								.05				3,000
Portland, Colo.	10	1.85		1.85				1.85		1.85				900
Potosi, Nev.	3	.40								.45		.75		700
Quicksilver, Cal.	100									2 75		2.85	2 75	350
Savage, Nev.	2½									.40		.70		600
Sierra Nevada, Nev.	3			.80		.94				1.25				1,100
Tenn. c., Tenn.	25	19.38	19.25	19.25	17.75	17.50	15.75							4,400
Union Con., Nev.	2½			.80								2.25		500
Union Cop., N. C.	10	2¾	2½	2⅝	2⅛			2½		2.63		2¾	2½	240
White Knob, g. s., Ida	100	10.50	10.00	11.38	10.50	11.25	10.50	12.13	11.50	11.50		11½	11⅜	4,112
Work, Colo.	1									.07				1,000
Yellow Jacket, Nev.	3					.40		.53		.53				300

BOSTON, MASS.*

Name of Company.	par val	Shares listed.	Jan. 7. H.	Jan. 7. L.	Jan. 8. H.	Jan. 8. L.	Jan. 9. H.	Jan. 9. L.	Jan. 10. H.	Jan. 10. L.	Jan. 12. H.	Jan. 12. L.	Jan. 13. H.	Jan. 13. L.	Sales.
Adventure Con., c.	$25	100,000	17¾	17	17⅛	16⅞					17	16¾	16⅜	16	650
Allouez	25	80,000	3½	3¼			3⅜	3¼	3¼		3½		3⅜		675
Amalgamated, c.	100	1,538,879	66¼	64	65	63½	65⅛	63⅝	65⅛	64	64⅜	63½			25,214
Am. Gold Dreg.	5	80,000													
Am. Z. L. & Sm.	25	60,000	7								7				55
Anaconda, c.	25	1,200,000									23½				1
Arcadian, c.	25	150,000	4¾	4⅝	4⅝	4⅜	4⅝	4⅝	5⅝	4⅜	5¼	4¾	4⅝	4	14,130
Arnold.	25	60,000													
Atlantic, c.	25	40,000	9¼		9						9⅛	8½	9¼	9¼	630
Bingham Con., g. s.	50	150,000	30	29½	30⅜	29⅜	30½	30	30	29¾	30¼	30	30⅜	30	2,010
Bonanza	10	300,000	.80				.75								1,300
British Columbia	5	250,000													
Cal. & Hecla, c.	25	100,000	498		499½	498	517	498	515	510	520		520		377
Centennial, c.	25	90,000	20¾	20	21⅝	19¾	23⅝	20⅝	24	23⅛	23¾	23	23⅜	21¾	19,188
Central Oil.	25	60,050	6½		6½						7		7		310
Cochiti.	10	182,250													
Con. Mercur, g.	5	1,000,000	†1⅝		1⅜		1¾		1⅝		1¾		1¾	1⅝	9,160
Continental Zinc	25	22,000													
Copper Range Con.	100	285,000	60	59	62	60⅜	63⅜	61½	65½	63¾	66	64⅞	63½	63	38,722
Daly-West., g. s.	20	180,000	42½	41½	44						43		43¼	42	380
Dominion Coal.	100	150,000	131		131½	131¼	131½		131⅞		131⅝				425
Dominion Coal, pf.	100	30,000													
Dominion I & S.	100	100,000	62	60¼	61	58	60	58½	60	59	59⅜	57½	57½	55½	8,460
Elm River.	12	100,000	2½		2½				3¾		2½	2¼	2⅝		480
Franklin, c.	25	100,000	10½				10⅜		10⅜				10½	10½	210
Guanajuato Con.	5	385,000	2¾	2½	2¾	2½					3	2¾	2¾	2⅝	3,794
Isle Royale Con., c.	25	150,000	12¼		12	11½	11¾		11¾		11½				240
Mass Con., c.	25	100,000	15⅞	15½	15½	15	15⅞	15	15		15				2,121
Mayflower, c.	25	100,000	2												40
Michigan, c.	25	100,000	10	9¼	9⅝	9					10	9¾			250
Mohawk, c.	25	100,000	45	44¼	44⅛	43½	45¼	44	45		45	44¼	44⅜	44¼	2,730
Mont. Coal & Coke.	25	200,000	7⅜	6¼	7⅝	7¼	7½	7¼					6¾		4,560
Mont'l & Boston, c.	5	570,000	2¼			2¼	2½	2 1/16	2⅝	2½	2⅝	2 7/16	2 5/16	2¼	9,642
National	25	100,000													
Old Colony, c.	25	100,000	1¾		1½				1¾		1¾		1¾		581
Old Dominion, c.	25	150,000	18¼	17½	18½	18	19⅜	18½	19¼	19	19⅛	18½	18½	17½	2,885
Osceola, c.	25	96,150	62½	60	61	59	61½	60¾	62		61¾	61	61½	60	1,512
Parrot, s. c.	10	229,850	27½	26½			28	27	28	27½	28½	28	27		462
Phoenix Con., c.	25	100,000	5¼	5	5		5				5¼	5			735
Quincy, c.	25	100,000			117	115	120	119			120				90
Rhode Island, c.	25	100,000	2⅝	2⅜			2⅛								130
Santa Fe, g. c.	10	250,000	2½	2⅜			2						2	1¾	975
Shannon, c.	10	186,296	12	11¾	11¼		11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11	1,170
Tamarack, c.	25	60,000	152½		155	152	155	150	154		154		153	151	392
Tecumseh.	25	80,000	1¼	1											80
Trimountain	25	100,000	90	89	93	90	94½	93	94½	94¼	92	89¾	92½	91	4,252
Trinity, c.	25	160,000	12	11¾	11⅝	11¼	11⅜	11¼	11⅝	11¼	11⅜		11¼		4,004
United Copper	100	450,000													
United States, g.	25	250,000			22¾	22⅜					22½	22	22¼	21⅞	7,408
U. S. Coal & Oil.	25	240,000	15	14½	15	14½	14½	14¼			14		14		1,672
Utah Con., g.	5	300,000	26	25¼	25½	25¼	24⅜	24	24		24¼	24	24¼	24	2,479
Victoria, c.	25	100,000	6¾	6½	6½	6¼	6¼				6⅜		6¼	6¼	780
Washington.	25	60,000	.15												100
Winona, c.	25	100,000	6¾	6	6¼	6	6⅜	6¼	6¼		6¾	6¼	6⅝	6¼	5,432
Wolverine c.	25	60,000	68	67	69	66	67½	67	66¾		68	68	69½	68	609
Wyandot.	25	100,000			1										100

†Ex. Dividend. Total sales, 181,602 shares.

Coal, Iron and Industrial Stocks.

Name of Company.	Par val	Jan. 7 H.	Jan. 7 L.	Jan. 8. H.	Jan. 8. L.	Jan. 9. H.	Jan. 9. L.	Jan. 10. H.	Jan. 10. L.	Jan. 12. H.	Jan. 12. L.	Jan. 13. H.	Jan. 13. L.	Sales
Allis-Chalmers, U. S.	100	19⅛	19¼	18⅞		19		19½		19				700
Allis-Chalm's, pf, U.S.	100	86⅛				86				86				430
Am. Agr. Chem., U.S.	100	23				22¾	22	23¾		24		25	21¾	600
Am. Agr. Chem. pf, U.S.	100			86	84	90	82			83½	83	90	82	400
Am. Sm. & Ref., U.S.	100	45⅝	44	47½	45½	47	46¼	46½	46¾	46⅜	46	45¾	44¼	2,840
Am. Sm. & Ref. pf, U.S.	100	94⅛	94	95⅜	94⅞	95½	94¾			94¾		94¼		3,660
Am. Steel & Fdy., U.S.	100	17	16½	16		17	16			20	19	19⅞		1,100
Am. S. & Fdy. pf., U.S.	100					68	67	67¾				68		400
Col. Fuel & I., Colo.	100	82	81½	81⅛		81½	80⅞	80½		80	79⅞	78½	76	9,000
Col. & H. C. & I., Colo.	100	20¼	20			20½	20¼	20¾	20½	20½	20⅛	20½	19½	2,960
Crucible Steel, U. S.	100	20	19¾	19¾		20	19⅞			19¾		19⅜	19½	980
Crucible Steel, pf, U.S.	100	85¼	85	85¼	85	85½	85⅛			85½	84⅜	85		1,157
Mong. R. Coal, Pa.	100	11½	11⅜	11¾		11½				12⅜	12	11⅞	11½	1,350
Mong. R. Coal pf, Pa.	100	39		39¼	39	39¼	39⅛			39½				493
National Lead, U.S.	100	28½	27¾	29	28	28⅝	28	28⅜	27¼	28	27¾	27½	23⅞	10,630
National Lead pf, U.S.	100			93	92¾	92½				92				780
Phila Nat. Gas.	100	46¾		46¼								45¾	45⅜	457⅜	279
Phila Nat. Gas, pf.	100													
Pittsburg Coal, Pa.	100	29½	28⅝	28⅝	28½	28½	28⅛							
Pittsburg Coal pf, Pa.	100	89¾	89½	89½	89⅜	90	89½					28		3,990
Republic I & S., U.S.	100	21¾	20⅝	21⅜	20⅝	21½	21	21¼	21	90	89¾	90	89¾	1,450
Republic I. & S., pf, U.S.	100	78¼	78	78¼	77⅝	76	75	79		20⅝	20½	20¾	20¼	9,600
Sloss-Shef S. & I., Ala.	100	62		62⅜	62	62½	60½	61½		78½		78½	78	5,100
Sloss-Shef S. & I. pf, Ala.	100	91¼		91½		91½				61½		61½	60¼	1,560
Standard Oil, U.S.	100	748	745	740		740	733	735	733	740	735	740	736	773
Tenn. C. I. & R. R., Ala.	100	64⅛	62¼	63½	62¼	63¼	62¾	63⅝	63	62⅝	62	62	61	16,375
U. S. Red & Ref., U.S.	100	33	32½	35	33	34	32½			36	34			400
U.S. Red & R. pf., U.S.	100	55	52	55	53	54		57	55					
U.S. Steel Corp., U.S.	100	39	37¾	38¾	38¼	38⅞	38¼	38⅝	38⅛	38⅜	37½	37⅞	36¾	142300
U.S. Steel Corp. pf, U.S.	100	89¾	88¾	89⅛	89	89¾	88½	89¼	88¾	89	88¾	88⅝	88	80,354
Va.-Car Chem., U.S.	100	64¾	64	64¼	64	64¼	64	64¼	64	64	63¾	62½		1,925
Va.-Car Chem. pf, U.S.	100					128	121							
Va. I. C. & Coke, U. S.	100	34	33¾			35	34⅜			35¼	34⅝	35½	34¾	1,975
....														

Total sales, 542,492 shares.

COLORADO SPRINGS, COLO.*

Name of Company.	Par val	Jan. 5. H.	Jan. 5. L.	Jan. 6. H.	Jan. 6. L.	Jan. 7. H.	Jan. 7. L.	Jan. 8. H.	Jan. 8. L.	Jan. 9. H.	Jan. 9. L.	Jan. 10. H.	Jan. 10. L.	Sales
Acacia	$1	.07¾	.07¼	.07⅞	.07¾		.08¼	.09	.08½	.09	.08½	.08½	.08	6,000
Am. Con.	1	.01¾			.01¾	.02¼	.01⅜	.02¼	.02	.02⅛	.01¾	.02	.01⅞	5,000
Anaconda	1	.20	.13	.19	.17½	.20		20		.20		18		
Ben Hur	1		.02	.02⅜	.01⅝	.03		.02	.01⅞	.02	.01⅞	.03	.01¾	3,000
Blue Bell	1				.05½	.07	.05⅜		.05½	.07	.09	.08	.07	
C. C. & M.	1	.02½	.02⅛	.02⅛	.01½	.02¾	.02⅛	.02¼	.02⅛	.02½	.02¼	.02½		2,000
C. K. & N.	1	.13		.13¾	.13⅜	.14	.13⅜	.14⅜	.14	.15	.14⅜	.15½	.14½	11,000
C. C. Con.	1	.05	.04⅝	.05⅝	.05¼		.05⅜	.06	.05½	.06	.05⅝	.06	.05⅝	15,000
Coriolanus	1	.03⅜	.03⅜	.03¼	.03	.03½	.03	.03¼	.03	.03½	.03	.03¾	.03	
Des Moines	1	.01⅞		.01⅞			.03	.02¼	.02	.02½	.02¼			5,000
Dr. Jack Pot	1	.10¼	.09⅜	.10¼	.09¾	.10⅛	.09¾	.10¼	.10	.11	.10⅛	.10¼	.10⅛	15,500
Elkton Con.	1	.32	.31¾	.35¾	.34	.36	.35	.36⅛	.36	.36⅜	.35½	.35¾	.34¾	11,700
El Paso	1	.68	.67½	.68½	.66	.68	.66½	.70	.67	.68	.66½	.68¼	.65¼	5,000
Fanny Rawlings	1	.04⅜	.04	.04⅞	.04	.04⅞	.04	.05	.04	.05	.04	.05	.04	
Findley	1	.11¼	.11	.11	.10⅝	.11¼	.10⅜	.11¼	.11	.11¼	.10½	.11¼	.11	11,000
Gold Dollar Con.	1	.04⅜	.04⅜	.04⅞	.04⅜	.05	.04⅜	.05⅛	.05	.05⅜	.05¼	.05½	.05¼	17,400
Gold King	1		.30	.47½	.40	.50	.40		.40	.50		.50		
Golden Cycle	1	.67	.65⅞	.66	.65	.67	.65	.70	.65		.68	.70	.69¼	5,000
Golden Fleece	1			.12				.25		.25	.05	.25	.05	
Gould	1	.04	.03⅞			.04⅜	.04			.04½	.04	.04¾	.03⅞	5,000
Hart	1	.04	.02½	.04	.02½	.04	.02¼						.02⅜	
Isabella	1	.30½	.30	.31	.30½	.30⅝	.30½	.30	.30	.30½	.30	.30	.29½	13,700
Jack Pot	1	.11	.09½	.10¾	.09⅜	.11⅜	.09	.11	.09	.11	.09	.11	.09¼	
Last Dollar	1		.65	.70	.50									
Lexington	1	.05	.04⅝	.05⅛	.04¼	.05⅜	.05¼	.06¼	.05½	.05	.04¾	6,000
Little Puck	1	.03¾	.03⅜	.04	.03½	.05	.03⅜	.04	.03½	.03⅜	.03¾	11,000
Mollie Gibson	1		.05¼	.05½	.05¼			.05¾		.05¼		.05¼		
Moon Anchor	1	.12	.07	.12¼	.07	.14	.09	.12½	.07	.15	.10	.10	.08	
New Haven	1	.02½	.02¼	.02½	.02⅜	.02⅝	.02⅛	.02⅜	.02⅛	.02⅞	.02⅝	.03	.02¾	2,000
Pharmacist	1	.05	.04¾	.06	.05½	.06¾	.06	.06	.05¾	.05½	.05¼	.05½	.05¼	31,000
Pinnacle	1	.04¼	.04½	.04⅝	.04¼	.04¼	.04	.04¼	.04	.04½	.04	.04½	.04	2,000
Pointer	1	.01¾	.01½	.01¾	.01⅝	.02⅛	.01⅝	.02	.01¾			.02	.01¾	15,000
Portland	1	1.80	1.70	1.85	1.75	1.90	1.75	1.80	1.70	1.80	0.71	1.75	1.66	3,060
Prince Albert	1	.02¼	.02¾	.03¼	.02¾	.03½	.02½	.03¼	.03		.03	.03½	.03	12,000
Vindicator Con.	1	1.07	1.06¾	1.07	1.06	1.07	1.04	1.07	1.04	1.06¾	1.06	1.07	1.06	8,000
Work	1	.07	.07¼	.07⅜	.07¼	.07½	.07¼	.07¾	.07⅝	.07⅜	.07¼	.07⅝	.07¾	11,000

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 230,300 shares.

COLORADO SPRINGS. (*By Telegraph.*)

Name of Company.	Jan. 12. B.	Jan. 12. A.	Jan. 13. B.	Jan. 13. A.	Name of Company.	Jan. 12. B.	Jan. 12. A.	Jan. 13. B.	Jan. 13. A.
Acacia	.08½	.08¼	.08¾	.08¼	Golden Cycle	.72	.66	.72	.66¾
Alamo	.04	.03½	.04	.03½	Golden Fleece	.15	.15	.15	.05
Anaconda	.19	.17	.19	.17	Isabella	.30	.28¾	.29½	.29
Cripple Creek Con.	.05¾	.05⅜	.05⅜	.05¼	Jack Pot	.11	.09	.10	.09¾
C. K. & N.	.16	.15	.17	.16	Last Dollar	.50	.30	.65	.40
Doctor Jack Pot.	.10¼	.10¼			Mollie Gibson	.06	.05½	.06	.05½
Elkton, Con.	.34½	.31¾	.34½	.33	Moon Anchor	.12	.08		
El Paso	.66	.65½	.66¾	.66½	Pharmacist	.05½	.05	.05¾	.05¼
Fanny Rawlings	.04¾	.04	.04¾	.04	Portland	1.67½	1.65	1.75	1.65
Gold Dollar Con	.05¾	.05	.05	.04¾	Work	.07½	.07	.07½	.07

STOCK QUOTATIONS.

MEXICO*. Jan. 3.

Name of Company	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango.				
Ca. Min. de Penoles	2,500	$50.00	$4,000	$4,500
San Andres de la Sierra	200	.....	10,000	30,000
Guananjuato.				
Angustias, Pozos	2,400	5.00	88	93
Cinco Senores y An., aviadoras	2,000	15.00	275	280
Cinco Senores y An., aviada	400	10.00	260	270
Providencia, San Juan de la Luz	6,000	2.00	215	218
Queensland y Australia	300	.....	130	140
Guerrero.				
Garduno y Anexas	7,200	.....	30	50
Hidalgo.				
Amistad y Concordia	9,600	3.46	76	76½
Carmen, aviada	1,100	.....	140	150
Guadalupe Fresnillo mill	1,000	.....	220	300
Guadalupe Fresnillo Mine	1,400	.....	80	110
La Blanca, aviadora	1,536	.....	900	940
La Blanca, aviada	768	.....	650	700
La Reina y au., aviadora	5,600	.....	20	22
Maravillas y An., aviador	1,680	.....	150	180
Maravillas el Lobo	1,000	.....	150	180
Palma y An., aviador	1,800	.....	9	12
Real del Monte	2,554	.....	750	800
Santa Ana y au., aviadora	1,800	.....	30	35
Santa Ana y au., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	7	8
Sta. Gertrudis y An., aviadora	28,800	1.00	80	81
Santo Tomas Apostol aviadoras	5,100	.....	3	4
San Felipe de Jesus, aviadora	3,600	.....	43	46
San Felipe de Jesus, aviada	1,200	.....	15	20
San Rafael y An., Trompillo	1,200	12.00	910	920
San Rafael y An., aviada	1,200	4.00	400	405
Soledad, aviada	960	5.00	355	360
Sorpresa, aviada	960	5.00	280	295
Mexico.				
Alacran	2,400	.....	$30	$35
Buen Despacho	3,000	.....	84	86
Dos Estrellas	3,000	.....	2,100	2,200
La Esperanza (E. Oro)	3,000	$10.00	1,160	1,170
La Reformia, aviadores	2,000	.....	56	60
Santa Ana, Esperanza	2,400	.....	80	90
Michoacan.				
Luz de Borda, aviadora	3,000	.....	48	5
Luz de Borda, aviada	1,000	.....	12	15
San Luis Potosi.				
Concepcion y An.	3,000	.....	75	85
El Barreno, aviadora	2,000	2.00	56	58
Sta. Maria de la Paz	2,400	10.00	800	805
San Diego y Annexas	2,400	4.00	30	40
Zacatecas.				
Asturiana y Au.	2,500	.....	45	55
Candelaria y Pinos	2,500	.....	250	275
Esperanza y Au.	2,400	.....	65	75
Lourdes	2,500	.....	45	65
Luz de Minillas, pagadoras	2,000	.....	25	30
San Carlos y Annexas	2,500	10.00	170	180
Sta. Maria de Gaud.	2,500	10.00	135	145
Miscellaneous.				
Bartolome de Medina	2,000	3.00	73	78
Guadalupe Hacienda	10,000	2.00	260	270
La Luz Hac. (Pachuca)	3,750	.....	230	240
La Reina (Chihuahua)	192	.....	2,500	3,500
Naica (Chihuahua)	100	.....	6,000	.....
Natividad (Oaxaca) aviadora	1,800	4.00	550	650
National (Oaxaca) aviadas	600	4.00	.....	.....
San Francisco Hac.	6,000	1.00	75	76
Santa Ana Huantla Morelos	4,000	.....	50	70
Union Hacienda	3,000	5.00	290	295

*Values are in Mexican currency.

SALT LAKE CITY.* Jan. 9.

Name of Company	Shares.	Par Val	High	Low	Sales.
Ajax	300,000	$10	.28	.28	200
Ben Butler	500,000	1	.08½	.08½	500
Bullion-Beck	100,000	10	.....	.....	.....
California	300,000	1	.28½	.23½	19,200
Carisa	500,000	1	.19	.17¼	7,100
Century	150,000	1	.91¼	.90	1,720
Con. Mercur	1,000,000	5	1.76¾	1.72	4,900
Daly	.....	.....	3.00	1.70	4,348
Daly-Judge	300,000	1	10.75½	9.95	3,825
Daly-West	150,000	20	44.50	40.95	3,825
Grand Central	250,000	1	.....	.....	.....
L. Mammoth	150,000	1	.72	.69½	4,700
La Reine	.....	.....	.....	.....	.....
M. Washington	.....	.....	.....	.....	.....
Mammoth	400,000	25	1.90	1.85	500
May Day	400,000	.25	.18¾	.16½	26,800
N. Y. Bonanza	.....	.....	.37¼	.30	16,300
Ontario	150,000	100	5.75	5.75	100
Sacramento	1,000,000	5	.31½	.29	8,950
Star Con	500,000	1	.13	.12	1,500
So. Swansea	300,000	1	.17	.17	2,200
Sunshine	250,000	10	.....	.....	.....
Uncle Sam, Con	500,000	1	.27¼	.24	5,900
Victor	500,000	1	.....	.....	.....
Wabash	.....	.....	.58½	.44¼	13,600
Yankee Con	500,000	1	58	.50½	3,200

All mines are in Utah. *By our Special Correspondent. Total sales, 132,925 shares.

ST. LOUIS, MO.* Jan. 9

Name.	Capital Stock,	Par Val.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo	$3,000,000	$10	$0.37	$0.70
Catherine Lead, Mo.	500,000	10	1.50	3.00
Central Coal & C	1,875,000	100	62.50	64.00
Central C. & C., pf.	1,875,000	100	70.00	.....
Central Lead, Mo	1,000,000	10	130.00	135.00
Columbia Lead, Mo.	500,000	10	11.00	12 50
Con. Coal, Ill.	500,000	100	21.00	22.00
Doe Run Lead Co.	1,500,000	100	130.00	139.00
Granite Bimet., Mt.	1,000,000	10	.86	.95
St. Joe Lead, Mo	6,000,000	10	21.00	22.50

*From our Special Correspondent.

PHILADELPHIA, PA.§

Name and Location of Company.	par val	Jan. 7. H.	Jan. 7. L.	Jan. 8. H.	Jan. 8. L.	Jan. 9. H.	Jan. 9. L.	Jan. 10. H.	Jan. 10. L.	Jan 12. H.	Jan 12. L.	Jan. 13. H.	Jan. 13. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	13	.....	.....	.....	.....	.....	400
Am. Cement	10	9	8⅛	9	8⅛	9	8⅛	9	8⅛	8⅛	.....	8⅛	.....	2,110
Cambria Iron, Pa.	50	.....	.....	48¾	48¾	.....	.....	49	.....	.....	.....	48½	.....	79
Cambria Steel, Pa.	50	26⅝	26½	26⅝	26⅜	26⅝	26⅜	26½	.....	26⅜	26⅜	26⅜	25⅞	8,533
Penn. Steel, pfd.	100	93¼	.....	93¼	93	.....	.....	.....	.....	92⅜	.....	.....	.....	550
Susq. I. & S., Pa.	5	.....	.....	.....	.....	3	.....	.....	.....	2⅞	.....	.....	.....	245
United Gas I., Pa.	50	111½	.....	111½	.....	111⅜	111½	111½	.....	112¼	111¼	114¾	112¾	2,897
Warwick I. & Steel	10	5¼	5	5	.....	5¼	.....	5¼	.....	5	.....	5¼	.....	1,849

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 16,663 shares.

LONDON. Dec. 29.

Name and Country of Company	Authorized Capital.	Par value.	Last dividend. Amt.	Last dividend. Date	Quotations. Buyers.	Quotations. Sellers.
	£	£. s. d.	s. d.		£. s. d.	£ s. d.
Alaska-Treadwell, g., Alaska	1,000,000	5 0 0	1 6	Jan,. 1902	4 7 6	4 12 6
Anaconda, c. s., Montana	6,000,000	5 0 6	2 0	Nov., 1902	4 17 6	5 0 0
Arizona, c., Def., ord	63,444	1 0 0	4 0	July, 1901	7 5 0	7 15 0
Arizona, pref., ord	316,530	1 0 0	4 0	July, 1902	7 10 0	7 15 0
Arizona, Cum., pfd	316,530	1 0 0	£7	Nov., 1902	128 0 0	133 0 0
Camp Bird, g., Colo	1,000,000	1 0 0	0 7½	Dec., 1902	1 7 3	1 7 9
Copiapo, c., Chile	225,000	2 0 0	2 6	Dec., 1901	1 17 6	2 2 6
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	15 0	17 6
Enterprise, g., British Col	200,000	1 0 0			2 d	7 6
El Oro, g Mexico	1,000,000	1 0 0	1 6	Dec., 1902	1 5 0	1 7 6
Frontino & Bolivia, g., Colombia	140,000	1 0 0	3 0	July, 1901	18 9	1 1 3
Hall Mg. & Sm., c. s., British Col	325,000	1 0 0	1 0	May, 1898	1 6	2 0
Le Roi, g., British Col	1,000,000	5 0 0	5 0	Nov., 1899	1 6 3	1 8 9
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	May, 1902	17 6	1 0 0
Mesquital, Mexico	250,000	2 0	rts.	July, 1902	4 5	4 5
Montana, g. s., Montana	600,000	1 0 0	6	April, 1899	2 6	3 0
Mountain, c., Cal.	1,250,000	5 0 0	5 0	April, 1902	3 2 6	3 7 6
Stratton's Independence, Colorado	1,100,000	1 0 0	6	April, 1902	6 0	6 6
St. John del Rey., g., Brazil	600,000	1 0 0	6	Dec., 1902	14 6	15 6
Tomboy, g., Colo	300,000	1 0 0	1 0	July, 1902		
Utah Con., g., (High. Boy), Utah	300,000	1 0 0	5 0	Dec., 1901	4 15 0	5 5 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	10 0	12 6
European:						
Linares, l., Spain	45,000	3 0 0	9	Oct., 1902	2 5 0	2 15 0
Mason & Barry, c., sul., Port'g'l	185,172	1 0 0	13 0	May, 1902	3 5 0	3 10 0
Rio Tinto, c., Spain	1,625,000	5 0 0	22 6	Nov., 1902	42 6 0	42 5 0
Rio Tinto, pref., Spain	1,625,000	5 0 0	2 6	Nov., 1902	6 0 0	6 5 0
Tharsis, c., Spain	1,250,000	2 0 0	8 0	May, 1902	4 0 0	4 5 0
Australia and New Zealand:						
Assoc. Gold Mines, W Australia	500,000	1 0 0	1 6	Jan., 1900	1 12 6	1 15 0
Brisels, Tin, Tasmania	600,000	1 0 0	.....		8 6	9 6
Broken Hill Pr'p., s., N. S. Wales	384,000	8 0	1 0	Aug., 1902	1 7 0	1 8 0
Cosmopolitan Prop., W. Australia	385,000	1 0 0	6	July, 1902	15 6	16 6
Fingall Reefs, Ext., g., W. Australia	149,150	10 0	.....		2 0	3 0
Golden Horse Shoe, W. Australia	300,000	5 0 0	0 0	Nov, 1902	8 12 6	8 15 0
Great Bo'd'r Pr'p., W. Australia	175,000	2 0	6	Oct., 1902	19 3	19 9
Ivannoe Gold Corp. W. Australia	1,000,000	5 0 0	4 0	Oct., 1902	7 6 3	7 7 6
Kalgurlie, g., W. Australia	120,000	1 0 0	2 6	Oct., 1902	3 13 9	3 16 3
Lake View Cons., g., W. Australia	250,000	1 0 0	5 0	Nov., 1901	2 6 3	2 8 9
Mt. Lyell M. & R. I., c., Tasmania	825,000	3 0 0	1 0	Dec., 1902	2 7 6	2 10 0
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Jan., 1902	4 0 0	4 5 0
Waihi, g., New Zealand	497,412	1 0 0	2 6	Dec., 1902	5 1 3	5 3 9
Indian:						
Champion Reef, g., Colar Fields	236,500	10 0	2 0	Sept., 1902	6 15 0	6 17 6
Mysore Gold, Colar Fields	265,000	10 0	4 0	Nov., 1902	6 13 9	6 16 3
Nundydroog, g., Colar Fields	242,000	10 0	1 3	Nov., 1902	1 17 6	2 0 0
Ooregum, g., Colar Fields	171,500	10 0	1 3	Dec., 1902	1 12 6	1 15 0
Ooregum, pref., g., Colar Fields	120,000	10 0	1 3	Dec., 1902	1 18 9	2 1 3
African:						
Angelo, g, Transvaal	275,000	1 0 0	8 0	June, 1902	7 10 0	7 15 0
British S. Africa, chartered S. Africa	5,000,000	1 0 0	rts.	May, 1899	3 12 6	3 15 0
Cape Copper, S. Africa	600,000	2 0 0	2 3	Dec., 1902	2 7 6	2 12 6
Cape Copper, pref., S. Africa	150,000	2 0 0	2 3	Dec., 1902	2 17 6	3 2 6
City and Sub'n (New), g., Transvaal	1,300,000	4 0 0	3 0	Aug., 1899	7 0 0	7 2 6
Crown Reef, g., Transvaal	120,000	1 0 0	10 0	Oct., 1902	17 15 0	18 5 0
De Beers Con., d., pref., Cape Colony	2,000,000	2 10 0	10 0	Jan., 1903	19 8 9	19 11 3
De Beers Con., def.	2,100,000	2 10 0	12 6	Jan., 1903	22 13 9	22 16 3
East Rand, Mg. Transvaal	400,000	1 0 0	.....		5 12 6	5 15 0
East Rand, Prop, Transval	970,000	1 0 0	rts.	May, 1902	8 6 3	8 8 9
Ferreira g., Transvaal	90,000	1 0 0	10 0	Jan., 1902	24 0 0	24 10 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	5 0	Aug., 1902	7 0 0	7 2 6
Geduld, g, Transvaal	400,000	1 0 0	rts.	May, 1902	7 7 6	7 10 0
Goldfields, Matabeleland	300,000	1 0 0	2 0	May, 1902	1 2 6	1 5 0
Henry Nourse, g., Transvaal	125,000	1 0 0	10 0	June, 1899	9 12 6	9 17 6
Jagersfontein, d., Orange F. S.	1,000,000	5 0 0	6 0	Nov., 1899	27 17 6	28 2 6
Jubilee, g., Transvaal	50,000	1 0 0	5 0	July, 1899	6 2 6	6 7 6
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept., 1899	4 6 3	4 8 9
May Con., g., Transvaal	280,000	1 0 0	3 0	Feb., 1902	4 13 9	4 16 3
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Aug., 1902	6 0 0	6 5 0
Modderfontein Deep	90,000	1 0 0	.....		4 12 6	4 17 6
Namaqua, c., Cape Colony	200,000	2 0 0	2 0	June, 1902	2 15 0	3 0 0
Primrose (New), g., Transvaal	300,000	1 0 0	6 0	Aug., 1899	4 6 3	4 8 9
Rand Mines, g., S. Africa	448,989	5 0	4 0	Aug., 1902	11 13 9	11 16 3
Robinson, g., Transvaal	2,750,000	5 0 0	6 0	Jan., 1903	11 8 9	11 11 3
Robinson Deep, g., Transvaal	950,000	1 0 0	5 0	May, 1899	5 10 0	5 12 6
Salisbury, g., Transvaal	93,000	1 0 0	2 0	Mar., 1899	2 17 6	3 2 6
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1898	1 3 9	1 6 3
Wemmer, Transvaal	80,000	1 0 0	15	July, 1902	14 0 0	14 5 0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

LONDON. (*By Cable*).

Name of Company.	Jan. 6, £. s. d.	Jan. 13. £. s. d.	Name of Company	Jan. 6. £ s. d.	Jan. 13. £. s. d.
Anaconda	.....	5 0 0	Jagersfontien	27 5 0	27 5 0
British South Africa	3 10 0	3 12 6	Johannesburg Invest	3 10 0	3 12 6
Con. Gold-Fields	8 1 3	8 5 0	Rand Mines	11 6 3	11 8 9
De Beers Con. def	22 6 3	22 10 0	Rio Tinto con	43 5 0	43 2 6

PARIS. Dec. 24.

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Boleo	Lower Cal.	Copper	.....	500	176.00	1,900.00	950.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	26.50	24.00
Fraser River	Brit. Col'mb.	Gold	250,000	25	.....	6.50	6.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	87.00	89.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	437.00	435.00
Nickel	N. Caled'nia	Nickel	15,000,000	250	10.00	445.00	440.00
Rebecca	Colo'do, U. S.	Gold	5,000,000	25	.....	1.25	1.25
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	575.00	580.00

TORONTO, ONT.* Jan. 12.

Name of Company.	par val	Prices. High.	Prices. Low.	Sales.	Name of Company	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.09	.06	.....	Granby Smelter	$1	375	325	.....
Cariboo (Mc. K.)	1	.18½	1	.....	Mountain Lion	1	.15	.10	.....
Cariboo (Hyd.)	1	.75	.....	.....	North Star	1	.12	.12	.....
Center Star	1	.40	.36¾	500	Nova Scotia Steel, com	1	111	108	.....
Crows Nest, C.	100	400	300	.....	Payne	1	.10	.07½	.....
Dominion Coal, com	100	132¼	131½	.....	Rambler Cariboo	1	.37	.30	.....
Dominion S. & I	100	51½	59¼	25	Republic	1	.10	.04¼	.....
Dominion S. I., pref.	100	.....	.....	.....	St. Eugene	1	.27	.20	.....
Fairview	1	.....	.....	.....	Virtue	1	.09	.05	.....
Giant	1	.03¼	.02¾	.....	War Eagle Con	1	.19½	.17	.....

*Standard Stock and Mining Exchange. Total sales 2,525 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

ABRASIVES—	Cust.	Meas.	Price.
Carborundum, f.o.b. Niagara Falls, Powd., F.FF.FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@09½
Mont., car-lots, f.o.b., Chicago	"		.07@.07½
Crushed Steel, f.o.b Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs.	"		.03½
Grains, in kegs.	"		.05@.05½
Chester flour, in kegs.	"		.03½
Grains, in kegs.	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs.	"		.01½
Grains, in kegs.	"		.02½
Crude, ex-ship N. Y.: Abbott (Turkey)	lg.ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh.ton		25.00@35.00
Pumice Stone, Am. powd.	lb.		.01½@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04½
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas			.12½
Chromic, crude			.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.43
Refined wood 95@97%	"		.60@.65
Purified	"		1.20@1.50
ALUM—Lump	100 lbs.		1.75
Ground	"		1.80
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, pure	"		1.50@2.00
Com'l	"		1.15@2.00
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.05½
AMMONIUM—			
Carbonate, lump	"		.07½@.08½
Powdered	"		.08¼@.09
Muriate	"		.05¾
Lump	"		.06¼
Nitrate, white, pure (99%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.06¾@.07¼
Oxide, com'l white, 95%	"		.09½
Com'l white, 95%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.03¾@.03½
Red	"		.06¾@.07
ASPHALTUM—			
Ventura, Cal.	sh.ton		$2.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.06½@.06
Trinidad, refined	sh.ton		35.00
San Valentino (Italian)	lg.ton		16.00
Seyssel (French), mastic	sh.ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh.ton		25.00@27.50
92@98%	"		28.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100 lbs.		1.67½@1.76
Chem. pure cryst.	lb.		.05
Nitrate, powdered	"		.05½

BARIUM	Cust.	Meas.	Price.
Oxide, Am. hyd. cryst.	lb.		$0.02¾
Sulphate (Blanc Fixe)	"		.02
BARYTES—			
Am. Crude, No. 1	sh. ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
German, gray	"		14.50
Snow white	"		17.00
BAUXITE—Ga. or Ala. Mines:			
First Grade	lg.ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		1.40
Subcarbonate	"		1.65
BITUMEN—"B"	"		.03½
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE	"		.40
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.30
" brown	"		.90
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh.ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		1.70@1.90
Foreign	"		1.65@2.25
"Rosendale," 300 lbs.	"		.75
Slag cement, imported	"		1.65
CERESINE—			
Orange and Yellow	lb.		.12½
White	"		.13½
CHALK—Lump, bulk	sh.ton		2.50
Ppt. per quality	lb.		.03¾@.06
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE—			
(50% ch.) ex-ship N. Y.	lg.ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg.ton		8.00
Am. best, ex-dock, N. Y.	"		9.00
English, common	"		12.00
Best grade	"		17.00
Fire Clay, ordinary	sh.ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.26@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—in bulk	100 lbs.		.37½
In bbls.	"		.42½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25 lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro, (82-2-10° Be.)			.18¾@18¾
FELDSPAR—Ground	sh.ton		8.00@9.00
FLINT PEBBLES—Dan. Best	lg.ton		14.75
French, Best	"		11.75
FLUORSPAR—			
Am. lump, 1st grade	sh.ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH—Lump	100 lbs.		.75
Powdered	"		.80

GRAPHITE—Am. f.o.b. Providence, R. I., lump	Cust.	Meas.	Price.
	sh.ton		$8.00
Pulverized	"		30.00
German, com. pulv.	lb.		.01¼@.01½
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03½
Best pulverized	"		.04@.08
Italian, pulv	"		.01¼
GYPSUM—Ground	sh.ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg.ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas color.	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.07¾@.08
Brown	"		.06@.06¼
Nitrate, com'l	"		.06½
" gran.	"		.06¾
LIME—Com., abt. 250 lbs.	bbl.		.80
Finishing	"		.90
MAGNESITE—Greece.			
Crude (95%)	lg.ton		6.00@6.50
Calcined	sh.ton		17.50@18.00
Bricks	M		170.00
Am. Bricks, f.o.b. Pittsburg	"		175.00
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—Powdered, 70@75% binoxide	lb.		.01¼@.01½
Crude pow'd. 75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03½
90@95% binoxide	"		.03½@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.18@.19
Domestic	"		.30
MARBLE—Flour	sh.ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse	sh.ton		35.00@38.00
Fine	lb.		.00½@.02
Sheets, N. C., 2x4 in.	"		.30
3x3 in.	"		.30
3x4 in.	"		1.50
4x4 in.	"		2.00
6x6 in.	"		3.00
MINERAL WOOL—			
Slag, ordinary	sh.ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 20 gr.: 25@30, cold test	gal.		.10½@.11
15, cold test	"		.11½@.12
Zero	"		.12½@.13½
Summer	"		.10@.11½
Cylinder, dark steam ref.	"		.09¾@.11½
Dark, filtered	"		.14½@.17
Light, filtered	"		.15½@.18½
Extra cold test	"		.22½@.27
Gasoline, 86°@90°	"		.16@.21
Naphtha, crude, 68°@73°	bbl.		9.05
"Stove"	gal.		.12
Linseed, domestic raw	"		.45@.46
Boiled	"		.48
Calcutta, raw	"		.75
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.05
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.25
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd.	"		.04¾@.05½
English flake	"		.06¼@.08½
Glassmakers'	"		.07¼@.08

PAINTS AND COLORS—	Cust.	Meas.	Price.
Metallic, brown	sh.ton		$19.00
Red	"		16.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01½@.01¾
Orange mineral, Am.	"		.07¾@.08
Foreign, as to make	"		.08½@.11¼
Paris green, pure, bulk	"		.10¾@.11
Red lead, American	"		.05¾@.06
Foreign	"		.06¾@.08
Turpentine, spirits	gal.		.58@.58½
White lead, Am., dry	lb.		.04½@.04¾
American, in oil	"		.05½@.05¾
Foreign, in oil	"		.06¾@.09¼
Zinc, white, Am., ex dry.	"		.04¾@.04¾
American, red seal	"		.06½
Green seal	"		.07
Foreign, red seal, dry	"		.05¾@.08½
Green seal, dry	"		.06½@.09¼
POTASH			
Caustic, ordinary	"		.04½@.04¾
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am.	"		.08½@.08¾
Scotch	"		.08½@.09
Carbonate (80@85%)	"		.02¾@.03
Chromate	"		.35
Cyanide (98@99%)	"		.21@.22
Kainit	lg.ton		9.05
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%.	"		1.13
Muriate, 80@85%	"		1.83
95%	"		1.88
Permanganate	lb.		.09¼@.10
Prussiate, yellow	"		.13@.13¼
Red	"		.38
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvinit	unit		.39½
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs.	bbl.		.72@1.18
N. Y. agricultural	sh.ton		4.40
SALTPETRE—Crude	100 lbs.		3.50@4.00
Refined	"		4.25@4.62½
SILICA—Best foreign	lg.ton		10.00@11.00
Ground quartz, ord.	sh.ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate	"		.33
Oxide	"		.85@1.10
SODIUM—			
Bichromate	lb.		.06¼
Chlorate, com'l	"		.07@.07¾
Hyposulphite, Am.	100 lbs.		1.60@1.65
German	"		1.70@1.90
Peroxide	lb.		.45
Phosphate	"		.02¼@.02¾
Prussiate	"		.09¾
Silicate, conc.	"		.05
Com'l	"		.01
Sulphate, com'l	100 lb.		.75@.82½
Sulphide	lb.		.01¼
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh.ton		13.75
N. Y., Fibrous, best	"		10.20
French, best	100 lbs.		1.25
Italian, best	"		1.62½
TAR—Regular	bbl.		2.20
Oil barrels	"		4.20
TIN—Crystals	lb.		.22
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¾
Carbonate, ppt.	"		.09
Chloride solution, com'l.	"		.02¼
Chloride granular	"		.04½@.04¾
Dust	"		.04¾@.04½
Sulphate	"		.02½@.02¼

THE RARE EARTHS.

	Cust.	Meas.	Price.
BORON—Nitrate	lb.		$1.50
CALCIUM—Tungstate (Scheelite)	"		.60
CERIUM—Nitrate	"		10.00
DIDYMIUM—Nitrate	"		35.00
ERBIUM—Nitrate	"		40.00
GLUCINUM—Nitrate	"		20.00
LANTHANUM—Nitrate	"		30.00
LITHIUM—Nitrate	oz.		.60
STRONTIUM—Nitrate	lb.		.07@.07¾
THORIUM—Nitrate 49@50%.	"		4.50
URANIUM—Nitrate	oz.		.25
YTTRIUM—Nitrate	lb.		40.00
ZIRCONIUM—Nitrate	"		8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.